

The impact of Trans-European
Networks on nature conservation:
a pilot project

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The impact of Trans-European Networks on nature conservation: a pilot project

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Acronyms

ARC/Info	ARC/Info Geographical Information System (software)
BLI	BirdLife International Secretariat - Cambridge UK
BT	British Telecom
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EN	English Nature
EU	European Union
EUROSTAT	Statistical Office of the European Communities
GIS	Geographical Information System
GISCO	Geographical Information Systems Community
HS	High Speed railway
SEA	Strategic Environmental Assessment
SFF	Secretariat pour la Faune et la Flore
TENs	Trans-European Networks
TERN	Trans-European Road Network
UNCED	United Nations Conference on Environment and Development
WCMC	World Conservation Monitoring Centre - Cambridge UK

Birdlife Partners

DOF	Dansk Ornitoligisk Forening - Denmark
HOS	Hellenic Ornithological Society - Greece
LPO	Ligue pour la Protection des Oiseaux - France
RSPB	Royal Society for the Protection of Birds -UK

Nature conservation areas

IBA	Important Bird Areas
MAB	Man and the Biosphere
Ramsar	Ramsar Sites
SAC	Special Areas of Conservation
SPA	Special Protection Areas
WHS	World Heritage Sites

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EXECUTIVE SUMMARY

The current impacts of the Trans-European Network (TEN) on the environment, and biodiversity in particular, are significant, and potentially very serious in the future. This pilot project is an attempt to quantify these impacts on Important Bird Areas (IBAs - see box in Introduction), and nationally designated sites.

Many planned roads and railways are close to IBAs, what this means for nature conservation is not clear:

- more than 12% (309) of EU IBAs are within 10km of planned road and rail developments
- more than 2% (57) of EU IBAs are within 2km of planned road and rail developments
- nearly 20% (9,335km²) of the area of French IBAs are within 10km of planned road and rail developments
- more than 4% (1,932km²) of the area of French IBAs are within 2km of planned road and rail developments
- more than 33% (26,000km²) of the area of nationally designated sites in the EU is within 10km of planned road and rail developments
- more than 8% (4,900km²) of the area of nationally designated sites in the EU is within 2km of planned road and rail developments

A road or rail development going close to, or even through, an IBA or protected area, does not necessarily damage the nature conservation interest of that site. However, enough concern has been raised about transport infrastructure and biodiversity (see for example RSPB 1994), that questions need to be asked.

Particular issues must be addressed in EU policy, including:

- the effect of transport infrastructure on sensitive habitats
- habitat fragmentation
- local pollution from salt or ozone
- more widespread pollution, such as in watercourses above wetlands
- wider issues such as nitrate pollution from vehicles and carbon dioxide emissions

In preparing these figures, a GIS-based approach was taken in order to illustrate the possibilities for Strategic Environmental Assessment (SEA). SEA is an extension of environmental impact assessment from projects to the policies, plans and programmes that are the context for an individual project.

The maps and figures produced for this pilot project show that such an approach both illustrates the environmental problems clearly and offers a powerful planning tool.

IBAs are used as an example because the database is comprehensive and in part digitised. Nationally designated areas also serve as a fairly complete example of the data required. Many other environmental indicators are not as well documented, and much effort is required to build up comprehensive databases.

INTRODUCTION

Aims and structure

This pilot study reflects BirdLife International's increasing concern over the potential impact that the Trans-European Network could have on Important Bird Areas (IBAs) throughout Europe. It also highlights the potential advantages of a well informed planning process, based on Strategic Environmental Assessment, capable of avoiding (or at least reducing) conflicts with nature conservation interests, in this case exemplified by IBAs.

Important Bird Areas - the BirdLife International definition

Important Bird Areas are a network of sites which are, at the biogeographical scale, critical for the long-term viability of naturally occurring bird populations, across the ranges of those species for which a site-based approach is appropriate. IBAs must also fulfil a set of conditions of which the most important are:

- site location should be chosen according to its international significance for the conservation of birds at the global, regional and subregional level
- sites must be chosen according to standardised, scientific criteria applied with common sense
- sites should be intended as practical tools for conservation

IBAs are the basis for the selection of Special Protection Areas under the Wild Birds Directive 79/409/EEC. See Grimmet and Jones 1989.

In order to implement the provisions set out in Chapter XII of the Maastricht Treaty on trans-European networks (TENs), the Commission produced guidelines for the transport sector in 1993. The guidelines define 'network schemes for the various transport modes, which illustrate the present status and how the network should develop progressively up to the year 2010' (CEC 1994a). They are aimed at:

- the completion of a single trans-European transport market by identifying the way to achieve adequate infrastructures, which promotes efficient and safe transport services under the best possible environmental and social conditions,
- paving the way to sustainable mobility for persons and goods across Europe,
- improving accessibility and strengthening economic and social cohesion'

(CEC 1994a).

This report attempts to quantify our concerns, while also contributing to the debate on the means to assess and reduce the environmental effects of the transport sector. In particular, we believe that methodologies and information exist that should be used to reduce the impact the TENs could have on nature conservation. It is with this in mind that we have focused narrowly on the potential effects on bird habitats as an example of what could be done to obtain an overview of TENs environmental impact.

Table I.1 SEA essential steps: the link with RSPB's pilot project

Essential steps		Relevant sections in the report	RSPB's pilot project on SEA of TENs
1	Determine the need for an SEA	1.1 1.2 1.3	Overview of EU political and legislative framework on integration and SEA. Reference to the Commission's intention to produce an SEA of TENs
2	Establish a work programme		Not included in the pilot project
3	Determine the key and intermediate objectives of the Policies, Plans and Programmes	2.1	The objectives of TENs are listed in COM(94) 106 final Article 2. Intermediate objectives are suggested, based on a series of Community policy documents on transport and the environment
4	Define the scope of SEA:		
	• characteristics of TENs	2.2.1	Information on the networks is limited since most plans are not finalised. The quality and limitations of existing information, and the need for further data collection is assessed.
	• baseline situation	2.2.2	Choice of topographical and environmental information to act as a reference point against which to predict and monitor any environmental change. The quality and limitations of existing information, and the need for further data collection is assessed.
	• relevant impact indicators	2.2.3	Impact identification matrices are adapted from project-level EIA matrices. Choice of indicators is closely linked to the characteristics of the objectives defined in Step 3.
	• impact prediction techniques	2.2.4	Based on GIS and computer modelling.
	• alternatives	2.2.5	Not included in the pilot project. (However, the study refers to general principles and points out the urgent need for a definition of alternatives to TENs).
	• consultation	2.2.6	Not included in the project. (However, brief reference to the important role of competent and relevant authorities - non-statutory and statutory - during the scoping phase)
5	Set up an environmental database	2.2.1 2.2.2	Includes basic topographical data and data on nationally and internationally protected areas (IBAs etc.). Sources include: Birdlife International Secretariat & Partners, WCMC, and EUROSTAT/GISCO.
6	Environmental analysis		
	• impact prediction	3.1	GIS computer modelling - initial suggestions
	• significance of impacts	3.2 3.3	The pilot study makes only broad brush comments on the results of the computer analysis.
	• mitigation measures		Not included in the pilot project.
	• impact evaluation of alternatives		Not included in the pilot project. (However, the study strongly recommends that the evaluation should be centred around the objectives identified in Step 3. It could be based on a matrix of alternative options and environmental components showing the scale and importance of each alternative in the appropriate cell).
7	Propose recommendations and prepare an SEA report		The study will essentially suggest a way forward for a full SEA of TENs.
8	Monitoring and feedback		Not included in the pilot project.

Source: The SEA method is an adaptation from 'Strategic Environmental Assessment' by Therivel et al. (1992) which derived the framework from elements of a proposal by the DoE (1991) and the US Department of Housing and Urban Development (USHUD 1981). The objectives-led approach and the use of 'impact indicators' derives from 'Strategic Assessment of the Firth of Forth' by ERM et al (1994).

The aims of this pilot study are:

- 1. To contribute to the ongoing debate on the present and future environmental impact of TENs**
 - highlighting the importance of integration and therefore coherence between this part of the Common Transport Policy and EU environmental policy (Part 1);
 - providing a cartographic and quantitative example of the potential impact of TENs on nature conservation (Part 3);
- 2. To contribute to the debate on Strategic Environmental Assessment (SEA) of TENs**
 - suggesting elements of SEA (Part 2) with particular attention to impacts on nature conservation;
 - presenting the results of the pilot analysis (Part 3);
- 3. To highlight the potential of SEA and the urgency of its implementation**
 - focusing on an overview of the possible impacts on the EU's nature conservation resources, and IBAs in particular;
- 4. To demonstrate the potential of GIS as a tool for policy research,**
 - testing the potential of the proposed SEA methodology by using Geographical Information System (GIS) (Part 3) to identify potential impacts of policies, plans or programmes (PPPs);
 - GIS seems capable of identifying means to avoid potential conflict between development policies and nature conservation (particularly on IBAs throughout the EU), and measuring the achievement of objectives set out in the Fifth Environmental Action Programme (CEC 1992e).
- 5. To highlight the fundamental role of data collection and the importance of defining clear boundaries for IBAs.**

The report is presented at a time when the guidelines for TENs are being proposed for a European Parliament and Council decision (7 April 1994). It is hoped that its suggestions and findings will contribute to the debate.

We recognise the limits of the approach we have taken to SEA in this project. The significance for populations of birds of the effects of TENs passing through or near IBAs is not clear. It is harder still to assess the cumulative effects across Europe. While we have selected birds as indicators of environmental damage (see Table 2.6), they may not be the best ecological indicators. However, the data on bird population trends is better than most other taxa (see Tucker and Heath 1994 Birds in Europe), with priority species identified. In addition, areas of habitat identified under the Wild Birds Directive 79/409/EEC and Habitats Directive 92/42/EEC should not be affected by TENs, and landtake may itself be a useful indicator in some situations.

1 INTEGRATION AND SEA

1.1 Integration in EU environmental policy and legislation

Environmental protection is at the heart of sustainable development, and needs to be built into policies, legislation and funding. The EU has taken several important steps to secure this,¹ so as to live up to international commitments and to the Treaty on European Union.

Reference to the need for some form of environmental integration in the Community's decision-making process can be found as early as the 1970s. The First Environmental Action Programme, adopted in November 1973, stated that

'effects on the environment should be taken into account at the earliest possible stage in all technical, planning and decision-making processes' (in CEC 1992d).

The importance of integration was further emphasised in the Third and Fourth Action Programmes. The concept was finally translated into European law only in 1987. That year the Single European Act stated:

'environmental protection shall be a component of the Community's other policies' Article 130r (2) 1987 Single European Act.

This was reinforced in the Maastricht Treaty:

'environmental protection requirements must be integrated into the definition and implementation of other Community policies' Article 130r (2) 1993 Treaty on European Union

The Fifth Environmental Action Programme (CEC 1992e)² clearly linked the concept of integration to sustainable development.³ It stressed that integration is the key to a successful move towards sustainability and that responsibility lies primarily with manufacturing industry, transport, energy, agriculture and tourism.

The following year (June 1993) Mr Paleokrassas and Mr Van Miert presented a Communication to the Commission entitled 'Integrating the environment into other policy areas within the Commission'. This document proposes a series of steps:

- to assess the environmental impact of the Commission's actions,
- to strengthen internal mechanisms to ensure that each Directorate-General takes account of the environment and of the requirement to contribute towards sustainable patterns of development
- to inform on the progress towards integration.

The document also states that the Commission and the Council acknowledge that integration of environmental concerns into the other policy areas is 'as crucial at the level of Member States and sub-national level as at Community level' (CEC 1993d). Indeed, most of the projects and programmes for Community funding are developed, proposed and implemented by the Member States.

It is clear that the Community intends to pursue and promote integration. There is increasing reference to the need to integrate environmental requirements in policies

¹ See for example CEC 1992d and CEC 1993d.

² Adopted by the Commission 18 March 1992 and approved by European Parliament by Resolution 17 November 1992 and by Council Resolution 1 February 1993.

³ This link was also given priority at the UN Conference on Environment and Development, Rio de Janeiro 1992

which are not directly linked to the environment, both within policy documents and EU.

1.2 Integration in EU transport policy

Transport is one of the principal sectors where the Commission intends to apply integration mechanisms.

1.2.1 The environmental action programmes

The Fifth Programme (CEC 1992e) gives only a brief outline of a strategy aimed to improve the sustainability of transport (one of its five target sectors). This is partly explained by the fact that it was the subject of the forthcoming Green Paper and White Paper on transport (see below). The Institute of European Environmental Policy (IEEP) notes that by avoiding a claim of a fully sustainable solution, the Programme is more pragmatic than the two transport papers. It limits itself to call for a reduction 'or at the very least a containment' of the overall impact of transport on the environment, and according to IEEP this 'implies some pessimism as to the reconciliation of environmental protection with other Community goals' (IEEP 1994b).

1.2.2 The Green Paper

In 1992 the Commission produced a Green Paper on 'The impact of transport on the environment - A Community strategy for 'sustainable mobility' (CEC 1992a). The Paper defines a 'strategy' intended to 'enable transport to fulfil its economic and social role while containing its harmful effects on the environment' and was intended as 'a blueprint for the forthcoming White Paper' (CEC 1992a). It represented a major attempt to promote the integration of transport and environment policies.

The paper focused on operational pollution, land-use, congestion and risk as the main impacts of transport, giving an account of the conflict between current trends and sustainable development (EP 1992b). It recognised that improvements by the best available technology and stringent environmental standards will be offset by growth in traffic and congestion (para 117), highlighting the tension between greater mobility and sustainable development.

The choice of the expression 'sustainable mobility' could be interpreted as a demonstration of the Community's struggle to come to terms with very different - if not conflicting - interests. Incorporating sustainability in the transport sector 'would require a clear shift away from the objectives of catering for the demand for mobility...towards the objective of securing an adequate level of access to people, goods and services within certain environmental constraints' (IEEP 1994a).

Overall, the document fails to lay down the foundations for an EU policy on sustainable mobility. As argued by the Economic and Social Committee(ECOSOC), 'The document sets out a list of the issues rather than provide a carefully devised and consistent basis on which to formulate EC policy' (EC 1992b, para 1.1). It is the view of the European Parliament that such basis a requires 'a clear indication of priorities, and the time scale within which they are to be implemented. These features are, regrettably, absent from the Green Paper' (EP 1992b).

The paper advocated a common strategy for sustainable mobility based on a combination of initiatives: standardisation, market organisation and economic instruments, research, land use planning and initiatives leading to changes in

behaviour of transport users (para 108). It encouraged 'more environment-friendly modes as well as efficient use of existing capacity...[and] the use of fiscal and economic instruments in order to influence the operator's choice in favour of cleaner technology and the more environment-friendly transport modes' (para 118).⁴

However, no evidence is offered to show that the proposed strategy will reconcile different interests (see for example IEEP 1994b). The generic statement whereby it will 'ensure that transport continues to fulfil its economic and social functions under the most favourable environmental conditions, while safeguarding the freedom of choice of the user' (CEC 1992a) could be interpreted as a mere hope.

Other criticisms of the Green Paper included:

- no precise definition of 'sustainable mobility' (EP 1992a)
- no analysis of crucial issues such as the possibility of separating economic growth from an increase in the volume of transport (ie number of movements) (EP 1992b)
- failure to include fundamental principles stipulated in the Maastricht Treaty for achieving sustainable mobility (Articles 2, 3, 3b and 130r (2)) (EC 1992b)
- its scientific findings 'provide nothing new' (EC 1992b)⁵
- '[the Green Paper] does not analyse in depth the relation between economic growth, growth in the transport sector and a worsening of damage caused to the environment' (EC 1992b).

ECOSOC maintained that the forthcoming White Paper:

'should outline the future thrust of an EC economic and industrial policy designed to reduce demand for transport. This is a key element in achieving sustainable mobility. It is in fact the basic problem, to which the transport sector cannot find a solution but merely adjust' (in IEEP 1994b)

1.2.3 The White Paper

In December 1992 the Commission presented the White Paper 'The future development of the common transport policy - A global approach to the construction of a Community framework for sustainable mobility' (CEC 1992c). The White Paper redefined the Community's policy for the transport sector, particularly in the light of pressing environmental considerations. The underlying reason for producing such a document, however, is linked to the achievement of the Single European Market (SEM) which is centred on the concept of the free movement of people, goods and services. The implementation of SEM is likely to be an ongoing process for several years to come and the common transport policy is considered a crucial element of this process. This link seems the obvious reason why the White Paper echoed the Commission's reference to 'sustainable mobility', ignoring the Green Paper's emphasis.

The White Paper recognises the impacts of the transport sector:

⁴ Whilst the Green paper simply 'encourages' the adoption of environment-friendly forms of transport, the EP's resolution on the Paper 'Calls on the Commission to ensure, if a new Community project is needed, that as regards the further development of transport infrastructure, priority is given to environment-friendly forms of transport' (EP 1992a, emphasis added).

⁵ It refers to a series of documents which had reached the same conclusions in the past: Transport 2000 Plus (OJ C49, 24.2.1992), Green paper on the Urban Environment (OJ C269, 14.10.1991), Europe 2000 (OJ C339, 31.12.1991), Development of a European Network of High Speed Trains (OJ C191, 22.7.1991), Towards Trans-European Networks (OJ C14, 20.1.1992), Energy and the Environment (OJ C269, 14.10.1991) and Community Action Plan to assist Tourism (OJ C49, 24.2.1992).

'The development of the CTP has also to respond to wider issues of depletion of natural resources and environmental degradation at the global level' (CEC 1992c, par.36)

and refers to the conclusions of the Green Paper agreeing that 'Although technological progress and measures already taken will mitigate the environmental impact...the risk of the development of the transport sector being unsustainable...due to its broad environmental impact remains real' (CEC 1992c, para 28).

It refers to the need to 'correct environmental inefficiencies and improve the environmental performance of the transport sector' as 'one of the key objectives of the CTP', and claims that 'Protection of the environment is thus not an accessory to the CTP but one of its integral themes' (CEC 1992c, para 162). In chapter III 'Objectives and Scope of the CTP' it refers to the key role of integration in achieving sustainable mobility (para 36).

However, while the Green Paper generally highlights the significant nature of the environmental impact of transport, the White Paper tends to play down this aspect of the problem, and highlights the potential of the transport sector in contributing to the achievement of environmental objectives. The White Paper calls for transport systems which contribute to sustainable development and in particular 'to the solution of major environmental problems such as the limitation of CO₂' (para 40).

This emphasis leads to serious doubts as to how the Community and Member States intend to achieve the objective of integration between policies.

1.2.4 Conclusions

From the early 1970s onwards there has been an increasing awareness of the wide-ranging nature of transport's impact on the environment, going well beyond problems of air pollution and noise.

However, failure to produce clear objectives and targets in order to pursue the integration of environmental concerns in the transport sector raises doubts as to how the Community will balance these concerns against the strong impetus of the SEM. The many documents produced by Community institutions on the subject of transport since 1992 seem to have at least one thing in common: they all eventually state that transport should contribute to the attainment of environmental, social, and economic objectives. Persistent reference to such diverse and perhaps conflicting tasks could be interpreted as a sign of the Community's struggle to reconcile its original objective of economic prosperity with more recent objectives, related to social and environmental interests.

1.3 TENs, integration and SEA

1.3.1 Trans-European Networks (TENs)

Chapter IV of the White Paper is dedicated to the development of trans-European transport networks. These are part of a wider Community plan to establish and develop trans-European networks in the areas of transport, telecommunications and energy infrastructures.⁶ The rationale for the establishment of these networks was set out in a Commission Communication stating that communications links have historically developed to cater for largely national trade and travel. As a result,

⁶ In this report the acronym TENs will be used to indicate trans-European transport networks only, unless otherwise stated.

cross-border links are often less strong, and trans-European routes may be fragmented or lacking (in IEEP 1994b).

A new formal framework for Community action on transport infrastructure was created with the entry into force of the Treaty on European Union on 1 November 1993. Title XII of the Treaty defines the aims, prospects and limitations of Community involvement in this field (CEC 1993b).

Article 129c of the Treaty on European Union defines the role of the Community and the purpose of the guidelines. These will cover the objectives, priorities and broad lines of measures (master plans), and identify projects of common interest. The Community will support the financial efforts made by the Member States for the projects identified, particularly through feasibility studies, loan guarantees or interest rates subsidies; it may also help co-ordinate the policies pursued by the Member States and co-operate with third countries.

The importance of these guidelines is explained in the Commission's proposal for trans-European road network (TERN) and inland waterways (EC 1992a):

'The indicative nature of the master plans defined at Community level allows Member States the freedom to act or not to act, but their actions must follow the guidelines which they have accepted at Community level' (emphasis added).

The White Paper defines the 'guidelines' for the establishment and development of the networks as 'the foundation for Community actions on transport infrastructure' (CEC 1992c).

Master plans

To date, four master plans have been approved by the Council of Ministers of Transport:

- December 1990 - European high speed rail network
- October 1993 - combined transport, with work in two stages of 6 and 12 years
- October 1993 - roads, with 55 000 km of trans-European links including 12 000 km of motorway to be built in 10 years
- October 1993 - inland waterways, with the establishment of an interoperable network in 10 years.

In 1994 the Commission presented three other plans on:

- conventional rail infrastructure
- airport infrastructure
- seaports.

The October 1993 decisions were taken on the basis of Article 75 EEC and apply for a limited period only. A new proposal based on the Treaty on European Union and Article 129d was presented by the Commission and published in the Official Journal 8 August 1994, COM(94) 106 final. This proposal makes only very general statements with regard to the need to protect the environment, failing to recognise an effective impact of TENs and stressing other aspects of the network:

'Whereas the establishment and development of trans-European networks contribute to the attainment of major Community objectives, such as the

completion of the internal market and the strengthening of economic and social cohesion' (EC 1994a).

Particular concern comes from the criteria adopted to identify 'Projects of common interest' which are included in the networks and given privileged access to Community financial instruments (CEC 1994b). It is argued that the criteria make only a very weak attempt to include issues related to the environment:

Article 6

'Projects of common interest'

Any project which:

- pursues the objectives referred to in Article 2,
- concerns the network defined in Article 3,
- corresponds to one or more of the priorities referred to in Articles 5, and
- is potentially economically viable,

shall be considered of common interest' (EC 1994a).

Article 5 lists eleven priorities of which only one refers to environmental considerations: 'integration of environmental concerns into the design and development of the network' (EC 1994a). Since projects have to meet only one of these priorities to be eligible, the only other link to environmental concerns is the first of seven objectives listed in Article 2:

'ensure the sustainable and safe mobility of persons and goods within the area without internal frontiers under the best possible social conditions, while contributing to the attainment of the Community's environmental objectives' (EC 1994a).

Masterplans for road and railway networks

Trans-European Road Network

Within the Commission's Transport Infrastructure Committee a Motorway Working Group was set up specifically to develop proposals for the creation of TERN. This group was made up of the following:

- Commission (DGs VII, II, III, XI, XII, XVI)
- Member States
- European Conference of Ministers of Transport - ECMT
- UN Economic Commission for Europe - UNECE
- International Road Federation - IRF
- Permanent International Association of Road Congresses - PIARC
- Secretariat European des Concessionnaires d'Autoroutes a Peage - SECAP
- European Round Table (ERT - includes heads of 43 major companies: ICI, FIAT etc.)
- Association des Constructeurs Europeens d'Automobile - ACEA
- International Road Transport Union - IRU
- International Touring Alliance - ITA
- European Investment Bank - EIB

(CEC 1992f)

DG XI was the only element representing the interests of the environment. To our knowledge no non-governmental organisation contributed to the process. While integration had theoretically been espoused in policy documents, in practice, environmental issues were not represented in the decision-making process.

The Group's report 'Trans-European Networks: Towards a master plan for the road network and road traffic' was the basis of the Commission's proposal (EC 1992a). TERN will consist of 54,000 km of high standard road links across Europe, of which:

'37,000 km was in use on 1 January 1992

12,000 km is to be completed or upgraded by 2002 [40% of these will be in peripheral Member States of the Community]...

'The network includes links of motorway or near motorway standard (expressways) and, to a limited degree, infrastructure of a reduced standard. It also encompasses major works to overcome natural barriers and bypasses around major European conurbations' (CEC 1992f).

In an attempt to follow the crucial comments in the Green Paper, the Commission's proposal states:

'the Commission stresses that it is particularly necessary that road traffic contributes towards limiting air pollution, particularly in a multimodal framework, while not putting at risk the economic efficiency of the transport system and the freedom of choice of the users' (EC 1992a).

IEEP suggested that this shows the Community's dilemma in attempting to steer a course between growing transport demand and environmental constraints (IEEP 1994b). It is difficult to see a way in which road traffic could contribute towards limiting air pollution. Although demand management and reduction in road traffic could have a positive impact, they are not mentioned.

The proposal in COM(94) 106 final fails to make any clear reference to environmental safeguards and 'appears to ignore the desirability of an evaluation taking account of the needs of environmental protection' (IEEP 1994b).

Trans European Railway network

The railway network for Europe can be divided into three main components:

- European high speed (HS) railway network
- European conventional lines
- European combined transport (CT) lines.

As mentioned above, the HS railway network was approved in 1990 and CT lines in 1993. The proposal for conventional lines is currently being studied, and a Commission's internal document (SEC(93) 2128) was issued in January 1994. This fails to refer in any detail to the interactions between rail and the environment. Given the potential contribution that railways, with appropriate conditions and occupancy rates, could make to the achievement of the Community's environmental objectives, this seems a serious omission.⁷

By 2010 the HS railway network will be 22,088 km long including 9,000 km of new lines, 15,000 km of upgraded lines, the CT lines will be 30,613 km long, and the conventional lines will add up to 36,058 km (CEC 1990 and CEC 1994d).

⁷ On the contrary, the final document on the HS railway network (COM (90) 2402) dedicates an entire chapter to HS trains and the environment. Also, the Commission requested an SEA of the network which was published in 1993 (cf section 2.2.3).

Financial arrangements

Arguably the estimate of the Community's expenditure for transport infrastructure over the period 1993-1999 gives a strong indication of the increasing weight of infrastructure in the overall transport policy.

The EC's financial assistance to transport infrastructure since 1975 totalled ECU 31 billion. Over half of the ECU 24.5 billion, spent over the period 1982-1991, went to fund roads and motorways (the European Court of Auditors in IEEP 1994b).

Current policies are bound to promote a substantial increase in the Community's financial involvement.

Transport infrastructure, for all modes, will require an investment of ECU 1000-1500 billion over the period 1990-2010, ie around 1-1.5% of GDP in the EC (IEEP 1994b). The Community has decided to invest ECU 15 billion in the next five years for the advancement of the 26 priority projects alone.⁸ ECU 15 billion is almost 50% of the total EC expenditure on transport infrastructure since 1975 (i.e. ECU 31 billion).

Table 1.1 Member States expenditure on transport by mode 1991-1993

Transport mode	No. of links	Member States expenditure 1991 - 1993 (ECU millions)
Road	125	3418.6
Railway	10 +	2935.4
Railway for combined transport	57	na
Inland waterway	26	na
ports	na	227.9
Airports	na	790.6
Intermodal freight terminals	na	46.9

Source: EC 1994a and CEC 1994c

In the White Paper on growth, competitiveness and employment, transport and energy TENs are considered to require the direct investment of ECU 400 billion, of which ECU 220 billion alone would go to transport by the end of the century. This would represent an investment of ECU 30-35 billion a year (CEC 1994b).

The Commission is concerned that TENs will encounter significant funding problems. In its Communication (CEC 1994c) it offers an initial analysis of the scenario relating to the Eleven most mature priority projects (see below). Expenditure considered for the period 1994-1999 is half the total amount (ECU 31.8 billion instead of ECU 68 billion). Based on various assumptions of levels of involvement by the public and private sector and the EIB (a, b and c in Table 1.2), the document suggests that the programme could be facing a deficit of ECU 7-20 billion.

⁸ The 26 priority projects were identified by the Commission from the master plans. They represent an investment of ca. ECU 80 billion and the Community has already financed feasibility studies and work for ECU 332 million. This list was done in order to overcome some of the difficulties in mobilizing private-sector investment (ie. the inherent risks concerning feasibility, technical viability, authorisations, deadlines or competition from other modes; and the uncertainty about the return on, and hence the profitability of, the investment) (CEC 1994b).

Table 1.2 Scenario for financial investments related to the Eleven Priority Projects (ECU billions)

Estimated cost	Public sector - possible contrib. (nat., reg., local)	EU - Max. contrib.	Rail agencies - possible contrib.	EIB - possible financial contrib.	Private sector - possible financial contrib.	Likely deficit
31.8	11	3.8	1.6-2	a. up to 15% 2 b. up to 25% 3 c. up to 50% 5.3	7 - 8	a. 5 - 6.4 b. 4 - 5.4 c. 1.7 - 3.1

Source: CEC 1994c

Notes: a, b and c - various levels of public and private funding: see text for details
nat. - national
reg. - regional
contrib. - financial contribution

The need for a Strategic Environmental Assessment (SEA) of TENS

SEA is proposed by the Commission as an essential tool in order to promote integration:

'In considering all its actions the Commission will examine whether there are implications for the environment. Where there will be a significant impact on the environment a strategic assessment of the impact will be undertaken' (CEC 1993d).

SEA versus project-level EIA

The project-based EIA system defined in the EC Directive 85/337 on the Assessment of the Effects of certain Private and Public Projects has been under review in the last few years,⁹ revealing the following trends:

- the treatment of ecological and nature conservation issues is one of the poorest quality aspects of environmental statements done to date under the EIA process;
- the 'project'-based system is unable to address cumulative, indirect and synergistic effects of projects and the policy frameworks within which they are promoted; and
- EIA at a project level reacts to development proposals rather than anticipating them.
- The number of complaints received by the Commission as a result of inadequate EIA procedure.

SEA would address these problems. It can consider the cumulative impacts of more than one project and play an active role in steering developments towards environmentally resilient locations or away from sensitive ones (Pritchard 1993).

⁹ See for example Wood CM and Jones CE (1991) Environmental Statements in the UK-The initial experience. Project Appraisal 6(4):187-194; and CEC (1993) Report from the Commission of the Implementation of Directive 85/337/EEC. COM(93)28 final, Brussels.

And indeed, the Commission recognises at least two reasons for introducing SEA:

1. 'it is often too late to take alternatives or cumulative effects into account by the project stage. One example is a road project which is evaluated on the basis of its alignment and design characteristics and not on whether it (rather than a railway) is the appropriate solution to a problem - a decision which will have been taken at the planning stage'
2. '[SEA] helps to ensure the integration of an environmental dimension into the economic, industrial, agricultural social and other policies of the Community and of the Member States' (CEC 1992d).

SEA in Community policy and legislation

The Fifth Environmental Action Programme explicitly requests the introduction of environmental assessment for policies, plans and programmes.

In 1991 and 1992 the Commission proposed a Directive on the environmental assessment of decisions made during the planning process. The draft Directive proposes a 'tiered approach', aimed to avoid duplication of environmental assessments at the different stages of the decision making process. The proposed Directive seeks to identify those issues which are appropriate to each level of decision making. Thus, SEA should be adopted only when impacts cannot be adequately assessed at the project level, under Directive 85/337/EEC (IEEP 1994a).

The most concrete step towards regulating the subject is embodied in the new Regulations governing the operation of EU's Structural Funds. These introduced a requirement for a form of environmental appraisal ('environmental profile') of Member States' regional development plans.¹⁰ The Habitat Directive also requires a form of environmental assessment to be undertaken in respect of a plan or project likely to have a significant effect on Special Areas of Conservation or Special Protection Areas:

'Any plan or project not directly connected with, or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site, in view of the site's conservation objectives' Article 6(3) of the Directive (92/43/EEC).

The potential of SEA as a tool capable of raising the profile of environmental concerns in other policy sectors is significant. It is therefore not surprising that there have been serious difficulties in reaching an agreement between the Member States with regard to a Directive introducing SEA. Some hope is being raised in occasion of an amendment to the EIA directive 85/337/EEC which could extend to include some form of assessment of plans and programmes.

SEA and TENS

Notwithstanding the ongoing debate on the introduction of SEA in the Community's legal framework, the Commission has advocated on more than one occasion the

¹⁰ A set of guidelines for the production of environmental profiles (so called 'aide memoire') was produced by the Commission. Essentially it requires a description of key environmental issues (ie details of zones of special environmental interest and details of areas suffering from acute pollution) and an appraisal of the impact (ie how the Regional development Plan improves problems of pollution and stress on ecosystems, and how the objective of pollution prevention is incorporated into the design of RDPs in the fields of transport, water management and energy).

need to apply SEA to policies, plans and programmes (PPPs) related to the transport sector. PPPs are defined by a UN/ECE study as:

‘an action, or a course of actions, with a set of objectives and measures related to the deployment of financial or other resources or tools intended to affect the future use of natural resources, and the form or location of development and other activities in one or more social or economic sectors or geographical areas’ (UN/ECE 1992).

TENs are an essential element of the Common Transport Policy and at least four reasons can be identified for the Commission undertaking an SEA on the networks:

- The nature - transport infrastructure - and the sheer size of the networks (eg 55,000 km of motorways or high standard links)
- The fact that the Community will contribute to the financing of the majority of these projects
- The need to integrate environmental objectives into the Common Transport Policy
- An SEA would be the only means of assessing the ability of TENs to meet the first of its seven objectives:

‘ensure the sustainable and safe mobility of persons and goods within the area without internal frontiers under the best possible social conditions, while contributing to the attainment of the Community’s environmental objectives’ (EC 1994a).

The Green Paper recognised the need for an SEA of elements of the transport policy: ‘infrastructure planning should be made subject to...strict environmental impact assessment procedures at both the strategic and project stages, including evaluation of alternative options’ (CEC 1992a). And an even more direct reference to SEA can be found in the White Paper(CEC 1992c, para 383):

‘Strategic environmental impact assessment will be an integral part of the decision making process for transport infrastructure policies, programmes and investment decisions on individual projects’.

Finally, paragraph 10 of the Commission’s proposal for a Decision on TENs confirms that: ‘the Commission, as announced in its Communication,¹¹ will take up the environmental strategic assessment as part of the future network development. This together with a socio-economic assessment will be part of the basis for revising this Decision’ (CEC 1994a).

The intention to assess the strategic environmental impacts of TENs once a Council Decision on their guidelines has already been taken is, however, already in breach of the *raison d’être* of strategic EA itself. Namely:

‘(a) to alert interested governmental and non-governmental parties at the earliest possible time to the potential environmental impact of a new policy, plan or programme; (b) to ensure that environmental concerns are fully incorporated into decision making’ (UN/ECE 1992).

Steps taken to date by the Commission in order to start the SEA process of TENs have not been encouraging. In June 1994 it organised a Hearing of Experts : ‘Strategic Environmental Assessment of the Trans-European Network for

¹¹ See: CEC 1993b - COM (93) 701

'Transport' to discuss the existing level of knowledge and experience in SEA methods. The Council for the Protection of Rural England was present as one of the 'Experts' and raised serious doubts on the validity of the proposed approach:

'SEA is occurring too late in the decision-making process...instead of influencing the decision over whether the TEN should be established in the first place...The objective "to provide a forecast on the overall environmental impact of the TEN when fully completed"...assumes the TEN will be completed or established as planned'. Other objectives indicate that 'SEA is being seen primarily as a means of identifying mitigation measures to what was a fundamentally economic decision to establish the TEN, rather than as a way of avoiding environmental impact in the first place' (Sheate 1994).

The analysis of TENs impact is already overdue since several projects, which are part of the networks, are already at different stages of implementation, and in some cases are up to 80% EU funded.

In its recent report on Transport and the Environment the Royal Commission on Environmental Pollution recommended that:

Recommendation 68

'in scrutinising applications for grants in support of trans-European transport networks, we recommend that the European Commission give support only to those developments which are consistent with sustainable development and respect for the environment. It will be important to ensure that the construction of the trans-European networks, particularly the road network, does not distort the development of a more balanced common transport policy' (RCEP 1994).

The Christophersen Report

A Report prepared by the Chairman of the Christophersen Group¹² and presented to the recent summit of the Council of Ministers in Corfu (July 1994) offers a clear signal of the urgent need for action on SEA and TENs.

The Christophersen Group has the following objectives:

'The overall objective is the speedy completion of TENs with a view to the efficient operation of the single market; to reinforcing the Union's competitiveness, regional planning and the links with neighbouring countries; and to contributing to faster and safer means of communications for the citizens.'

The Group set itself the aim of:

- 'i) identifying priority projects and facilitating the subsequent work in specific project seminars;
- ii) speeding up administrative procedures and eliminating obstacles;
- iii) addressing the horizontal obstacles to implementation of TENs in terms of the regulatory framework and finance;
- iv) facilitating rapid political agreement on the transport and energy guidelines' (Christophersen 1994).

¹² The Group of Personal Representatives of the Heads of State and Government is chaired by Henning Christophersen, and is also known as the Christophersen Group. It assists the European Commission in its duty to lead and coordinate the speedy and efficient implementation of trans-European networks in transport and energy, as requested by the European Council in December 1993.

No reference is made to the environmental impacts of TENs or the need to examine them. Indeed, it is not clear whether the Group eventually considered this aspect or not.

The report states that 'Environment is not mentioned in Title XII of the Treaty concerning trans-European networks, and the European Council in December last did not give the Group a specific mandate to discuss it' (Christophersen 1994). Nevertheless, it concludes somewhat surprisingly saying that 'the environmental aspects of TENs in transport and energy are...an integral part of the Group's work'.

This last statement is certainly not supported by the contents of the Report. These suggest that it eventually focused only on the list of aims quoted. In the process of identifying priority projects and ways of accelerating them, the Group considered two main problems: the regulatory framework, and financing TENs.

The environment is mentioned in two occasions only: 1) referring to EIA as part of a set of 'substantial and procedural legal rules of the Member States and the EU' intended to guide the development of TENs, and 2) arguing that the choice of 11 priority projects 'shows that in planning transport infrastructure projects, much attention has been paid to the aspect of environmental protection. 88% of total investment will be dedicated to railways' (in Annex 3.B). While this is a welcome shift away from road-building it should be noted that five of the seven railway projects are High Speed lines. These too can have significant environmental impacts, both as a result of poor energy consumption when occupancy rates are low, and ecological barrier effects in some habitats.

The report does not refer to the environmental impacts of TENs, nor to the need for an SEA. Perhaps the group felt that an assessment of environmental implications would not promote a speedy completion of TENs, as set out in their mandate.

The report was presented to the Ministers requesting their approval amongst other things, for priority status for eleven transport projects. Recognition of priority status requires Member States to facilitate the implementation of these projects by accelerating the administrative, regulatory and legal procedures and processes that are at present delaying them (Christophersen 1994).

The eight criteria adopted by the Group to identify priority projects were agreed in conjunction with the EIB, on the basis of proposals made by the Commission. Projects should (Christophersen 1994):

1. be of exceptional scale
2. be of common interest
3. pass the test of economic viability
4. contribute to important Union objectives such as economic and social cohesion
5. allow scope for private investment
6. be mature, so that the projects can be implemented quickly
7. avoid public financing of infrastructure leading to distortion of competition
8. comply with Union's legislation regarding the protection of the environment

Although reference to the Union's environmental legislation is welcome, the legislation itself remains critically inadequate in protecting the environment. Thus the criteria represents a formal rather than a substantial inclusion of environment interests in the debate.

The Corfu Summit approved the Eleven Priority Projects in July 1994. This leads to serious questions with regard to the role of integration within the decision-making

process of TENs. In December 1994 three new projects were added to the list by the Christophersen group and presented the Essen Council of ministers for approval. The Council agreed to include them in what is now a list of 14 priority projects. It also stated that work on the transport project must start by the end of 1996.

1.4 Conclusions

Several references have been made in EU policy documents to the importance of considering environmental as well as the socio-economic aspects of the networks. Virtually nothing has been done in practice.

The European Parliament and the Council of Ministers are to discuss the adoption of two crucial documents: the Commission's proposals for a regulation on the financing of TENs and the guidelines for the development of TENs. These will dictate the character and pace of development of TENs. These discussions must cover the absence of a clear commitment to ensure integration of environmental protection requirements, as requested in the Treaty on European Union, Article 129c.

As a testing ground for the Commission's success in introducing integration within the Community's decision-making process, the TENs and the Common Transport Policy offers little hope. These plans are likely to produce contradictory effects which are contrary to the concept of sustainable development of the Fifth Environmental Action Programme.

There is a need for an SEA of the TENs as the best opportunity to put into practice the frequently-stated aim of integrating environmental issues into transport. In the meantime, pressing economic interests seem to be dictating the pace, as seen from the approval of Eleven priority schemes at the Corfu Summit.

2 ELEMENTS OF SEA METHODOLOGY

While there is potential for the integration of environmental objectives into Trans-European Networks, it is clear that there is a need for well-defined SEA to realise this potential. Part 2 aims to contribute to the definition of the key elements of an SEA method for TENs (Step 3 of Table I.1).

It suggests a set of essential steps which contribute towards an SEA of TENs, and focuses on those elements of SEA which evaluate the nature and extent of TENs impacts on nature conservation. This will provide the framework for an initial assessment of some of TENs' impacts on the environment (Part 3).

2.1 The objectives

2.1.1 Introduction

The study adopts an objective-led approach to SEA. This involves identifying the principal objectives of the Policies, Plans or Programmes (PPPs) under examination (i.e. TENs) and assessing alternative options against their ability to achieve these objectives. The objectives of TENs should include those of the Community's environmental policy.

The method represents a mixture between 'incremental' and 'strong' forms of SEA, as described in Therivel et al. 'Strategic Environmental Assessment', 1992.

- **Incremental SEA** 'seeks to ensure the selection of the least environmentally harmful option for delivering policies that are normally driven by non-environmental objectives' (IEEP 1994a).
- **Strong SEA** requires that environmental considerations are included in all policies, suggesting that all PPPs should be environment-led.

Although far from being environment-led, the proposed guidelines for TENs (cf section 1.2) appear to include the need to 'contribute to the attainment of the Community's environmental objectives' as part of the programme's objectives (Article 2, EC 1994a). This suggests a consideration for the environment which goes beyond that of policies characteristic of incremental SEA.

2.1.2 TENs Guidelines: Article 2 'Objectives'

Article 2 specifies the general objectives for transport set out in the Treaty on European Union, notably interconnection of networks, interoperability and access to the networks.

Table 2.1 The Objectives of Trans-European Transport Networks (COM(94) 106 final)

No.	Objectives
1	Ensure the sustainable and safe mobility of persons and goods within the area without internal frontiers under the best possible social conditions, while contributing to the attainment of the Community's environmental objectives
2	Offer users high-quality infrastructure and associated services on acceptable economic terms
3	Combine all modes of transport, taking account of their comparative advantages
4	Allow the optimal use of existing capacities
5	Be interoperable in all its components
6	Cover the whole territory of the Community, interlinking the major conurbations and regions of the Community, facilitating access in general, and linking island, peripheral and landlocked regions to the central regions
7	Allow for its extension to the networks of EFTA Member States, countries of central and eastern Europe and Mediterranean countries, while at the same time promoting interoperability and access to these networks

The first objective is particularly welcome, although its potential to introduce environmental concerns in the achievement of TENs will depend on the interpretation and emphasis given to it by the relevant authorities. It is therefore unfortunate that the Commission's comments on the Articles of the Guidelines (CEC 1994a) place little emphasis on the need to contribute to the attainment of the Community's environmental objectives. Instead, they refer to completion of the network as a key to the achievement of sustainable mobility: 'all network users benefiting from high-quality services offered on the network in a space without internal borders under acceptable economic conditions'.

The objectives call for an interaction between environmental, economic and social interests, which often conflict (cf section 1.2). However, sustainable development implies that social and economic needs should be set within a clear framework of environmental limits.

The wide spectrum of values covered by the objectives of TENs is in itself a strong argument in favour of SEA. It highlights the urgent need for a strategic assessment of the network, addressing economic, social and environmental implications.

Ideally, these layers of assessment should be conducted simultaneously and should be treated equally at the stage of final assessment of the programme, leading to the choice of the best option. An report along similar lines has been undertaken for the Firth of Forth (ERM et al 1994).

A parallel consideration of the economic, social and environmental implications of TENs would offer an overall view to the decision-maker which would be invaluable given the complexity and interrelatedness of its objectives. At its simplest, it would be desirable to have a single summary report combining the results of separate assessments. A more radical interpretation of SEA would see it as a constraint to economic interests.

2.1.3 Intermediate objectives

The study proposes the selection of intermediate objectives aimed to define the steps which will enable to achieve Article 2 objectives in concrete. The rest of the pilot project examines the first of the seven objectives for TENs, i.e. the key link between TENs and the Community's environmental objectives. The following interpretation of sustainable mobility is strictly limited to its environmental implications does not attempt to include the social and economic issues.

Most of the proposed intermediate objectives derive from Community policy documents. However, certain aspects have been taken from other EU sources, such as Parliamentary Resolutions or ECOSOC's Opinions.

Table 2.2 EU environmental policy objectives

Objective 1

Ensure the sustainable and safe mobility of persons and goods within the area without internal frontiers under the best possible social conditions while contributing to the attainment of the Community's environmental objectives (*emphasis added*)

Intermediate objectives	Impact Indicators
To minimise emissions of traffic related pollutants to the atmosphere (CO ₂ ; CO; NO _x and VOCs) (Green Paper)	<ul style="list-style-type: none"> • Air pollution • Traffic
To minimise noise pollution (Green Paper)	<ul style="list-style-type: none"> • Noise pollution
To minimise consumption of non-renewable resources (Green Paper)	<ul style="list-style-type: none"> • Primary energy consumption • Aggregate consumption • Landtake
To promote a shift towards environment-friendly modes of transport (Green Paper)	<ul style="list-style-type: none"> • All the above
To limit the physical impact of new roads (White Paper)	<ul style="list-style-type: none"> • Landtake • Indirect landtake • Ecological impact • Hydrological impact • Geology and geomorphological impacts • Landscape • Culture / archaeology
To maintain or restore habitats and species of wild fauna and flora at favourable conservation status (Habitats Directive)	<ul style="list-style-type: none"> • Landtake • Indirect landtake • Ecological impact • Hydrological impact • Geology and geomorphological impacts • Landscape • Culture / archaeology

Although the Green Paper fails to propose a clear framework for the achievement of sustainable mobility (cf section 1.2), a selection of related policy documents made it possible to highlight certain objectives which would contribute towards sustainability in the transport sector.

The intermediate objectives 'to minimise emissions of traffic-related pollutants to the atmosphere' and 'to minimise noise pollution' are based on the Fifth Environmental Action Programme and the Green Paper's promotion of measures laying down strict environmental standards for all vehicles, trains, aircraft and ships (paras 110-111 and 127). Their importance is further highlighted by the Parliamentary Resolution on the White Paper, which suggests the adoption of some of EU's major environmental policy decisions as binding objectives, notably:

- stabilisation of CO₂ emissions at 1990 levels by 2000,
- reduction of CO₂ emissions by 20% compared to 1989 by 2005 and
- reduction of emissions of other pollutants by 50% by 2005, taking into account particular environmental sensitivity, especially of those regions with a high concentration of economic and industrial activity and the need for sustainable growth in the less-favoured regions (para 10, EC 1993c).

The intermediate objective 'to minimise consumption of non-renewable resources' has two main elements: energy and aggregate consumption. The first is widely backed by the recognised need to promote energy (and fuel) efficiency (eg the Fifth Environmental Action Programme and the Green Paper para).

The intermediate objective 'to promote a shift towards environment-friendly modes' is also based on the Green Paper (para 118). Whilst the need 'to promote demand management' was given high priority by institutions such as ECOSOC and the European Parliament, which accused the Green and White Papers of failing to recognise its crucial importance for sustainability.

Nature protection and the maintenance of biological diversity (or biodiversity) are also important elements of EU's environmental objectives, as defined in the Fifth Environment Action Programme. This identifies a strategy for nature conservation based on two main axes (CEC 1992e):

1. Land use management involving sustainable development to promote the conservation of natural habitats
2. Biodiversity conservation involving the sustainable use of species to promote the protection of endangered species

Two important intermediate objectives are: to limit the physical impact of new roads, and to maintain or restore habitats and species of wild fauna and flora to favourable conservation status. These are included in several policy documents (eg the White Paper and Fifth Environmental Action Programme) and EU legislation (eg the Wild Birds Directive 79/409/EEC and Habitats Directive 92/43/EEC).

The Habitats Directive is the most significant piece of Community legislation for nature conservation and biodiversity protection. It aims to set up a coherent European ecological network of special areas of conservation (referred to as Natura 2000 in Article 3). SEA should make clear the impacts TENs would have on this network, and whether such impacts would endanger the aims of the Habitats Directive. In other words, it should contribute towards ensuring that the Natura 2000 Network is fully considered in other policy areas - in this case transport. SEA should overcome the weakness of the Habitats Directive in cases of 'national interest' (see Section 3.3.1).

We recognise the limits of the approach we have taken to SEA in this project. It is hard to define what the significance of the effects of TENs passing through or near IBAs is for populations of birds. It is harder still to assess the cumulative effects across Europe. While we have selected birds as indicators of environmental damage

(see Table 2.6), they may not be the best ecological indicators. However, the data on bird population trends is better than most other taxa (see Tucker and Heath 1994 *Birds in Europe*), with priority species identified. In addition, areas of habitat identified under the Wild Birds Directive 79/409/EEC and Habitats Directive 92/42/EEC should not be affected by TENs, and landtake may itself be a useful indicator in some situations.

2.2 The scoping exercise

Scoping identifies the types of impact associated with proposed TENs and selects suitable methods for their assessment (steps 4 and 5 of Table I.1). In particular it should identify:

- the range of environmental topics to be addressed
- the appropriate level of detail to be applied within each topic area
- the methods and approaches to be adopted for their assessment
- alternatives (EN 1994a and UN/ECE 1992).

Collection of information on the characteristics of TENs and those of the surrounding environment is essential to the scoping exercise. Given the geographical scale of TENs (which spreads over the entire surface area of the EU - 364,449 km²), an attempt to cover the area in detail would generate a vast quantity of data which would be cumbersome and excessively costly to manage. Therefore finding a balance between levels of detail and feasibility within the time available becomes one of the major difficulties in defining the scope of an SEA. There is a risk of outlining a framework of assessment which will offer an oversimplified - and therefore inapplicable - overview of the situation.

The Commission has endorsed a 'tiered approach' to the assessment of environmental impacts (cf 1.3.2). This limits inclusion of issues to those appropriate to a particular level of decision making. It assumes that SEA is placed at the top of a 'hierarchy of assessments' which requests increasingly greater detail as you move away from the policy level towards programmes and projects. Thus scoping at this level does not include all those activities typically examined in a project-level EIA.

The pilot project explores two levels of analysis:

1. A general 'EU and Member State level' approach where impacts are calculated at a European and national scale (for example see the maps of Europe in Part 3)
2. A more detailed 'Programme level' where impacts of segments of the proposed TERN (i.e. single road projects) can be examined (for example see the case studies of the Øresund Bridge and Via Egnatia in Part 3).

This is intended to offer some insight on the degree of feasibility and accuracy of two alternative scales of analysis, the first using GIS techniques, and the second taking a more traditional casework approach.

2.2.1 Data on the characteristics of TENs

Sections 2.2.1 and 2.2.2 briefly summarise the information available to date, and follow with suggestions on what sort of data would be worth collecting and developing for a complete SEA of TENs.

What is available

An indicative idea of TENs is offered by a set of maps for each Member State, on a scale of 1:4.5-5 million, enclosed in the Guidelines for TENs (cf section 1.3) in COM(94)106 final, recently published in the Official Journal (EC 1994a).

The very small scale of the data displayed results in a low resolution. However, in the case of TERN for example, the relatively rough lines representing the network often derive from pre-existing road systems of different classification (motorways, other dual carriageway systems, four lane etc.). Of course, this does not apply to the new segments of motorway or expressway to be realised by 2002 (approx. 12,000 km). Here the Guidelines show essentially corridors rather than exact routes.

Table 2.3 The length of TERN - a breakdown for each Member State

Member State	No. of schemes	Existing links - 1992	Planned new links	Total length of network	New MWs to be constructed	Existing MWs to be widened	New Ews to be constructed
Belgium	5	1390	100 ¹	1490	100		
Luxembourg	1	70	20 ¹	90	20		
Denmark	3	510	356 ¹	866	356		
Germany	20	10200	1600	11800	1600	2100	
Greece	13	850	2530	3380	530	310	460
Spain	19	6100	3562 ¹	9662	3562		
France	20	7700	4300	12000	3000	600	
Ireland	7	30	1140	1170	371		
Italy	12	5800	2111	7911	2111	805	
The Netherlands	5	1168	69 ¹	1237	69		
Portugal	9	320	1266	1586	1070		169
United Kingdom	10	2720	1200	3920	540	810	
Total	124	36858	18254	55112	13329	4625	656

Source: CEC 1992e

Notes:

¹ For this country all 'Planned new links' will be new motorways (i.e. no upgrading is anticipated)

MWs - motorways

EWS - expressways

NB - 'Total length of the network' is equal to the sum of 'Existing links - 1992' and 'Planned new links'

The final report of the Motorway Working Group (cf section 1.3.1) offers detailed information on the characteristics of projects linked to TERN. Table 2.3 shows that the Group planned to build 13,329 km of new motorways and 656 km of new expressways throughout the Union, and to upgrade 4,625 km of the existing roads (almost half of these in Germany), (EC 1992e).

The Commission's Database Management, Publications and GIS Unit (GISCO) dataset distinguishes between two categories of road and railway segments:

- existing segments (on which no further work needs to be done)

- planned segments (which include both new motorways/railways to be built and existing roads/railways to be upgraded)

It also distinguishes between segment types. For TERN it lists 'motorways', 'national' and 'principal' segments of national and European importance. The railway infrastructure dataset includes main and branch lines, double and single tracks, and electrified from non-electrified segments (EUROSTAT 1994).

Limitations and future needs

Failure to reflect the difference between new and upgraded segments has important implications for the analysis. The impact of building a new road/railway is greater than that of upgrading an existing one (cf section 2.2.4). Thus, the impossibility of locating new infrastructure on the digitised maps limits the analysis of spatial impacts.¹³

The TERN GISCO dataset is based on the network outlined by the Motorway Working Group in 1992. Since then, several countries have made considerable changes to the original masterplans. Section 3.3.2 shows the exact route of the Via Egnatia motorway in Greece, as defined by the Greek ministry. This should be treated as an example of the scale of approximation with which the pilot project is dealing.

These limitations are presumably a common aspect of dealing with impacts at a strategic (PPPs) level rather than at the project level. TENs involve planning infrastructure development to the year 2010 (except for TERN which should be completed by 2002). It would be unrealistic to expect all Member States to provide the exact routing of TENs before 1995.

As a result, impact prediction techniques must adapt to the state of the data available (cf section 2.2.4).

A full SEA of TENs by the Commission should however attempt to overcome these limitations. The relevant authorities in each Member State should be contacted in order to collect as much detail as possible on:

- the exact and up-to-date infrastructure routes and
- the distinction between new and upgraded road segments¹⁴

Some information on the principal activities associated with construction (eg bridges, junctions or feeding roads) and operational (eg traffic forecasts) phases should also be included in the assessment. This data is particularly useful when assessing landtake, secondary development and hydrological impacts. Some of the case studies (cf section 3.3) attempt to collect this base line information.

2.2.2 What baseline data is needed, and the reasons for choosing IBAs

Data collection should be geared towards the use of GIS for both spatial and global impact indicators. GIS is an essential analytical tool for soil and land use planning since it allows to examine relatively quickly a vast amount of data linked to soil erosion, pollution, nature conservation and land use policies covering large surface areas (cf section 2.2.3).

¹³ It should be noted, however, that COM(90) 2402 (page 44) presents a map of the HS railway network which distinguishes between new and upgraded lines.

¹⁴ Annex 8 shows an initial attempt to identify those segments of TERN which are likely to fall in the category of 'new motorways', using the 1994 Michelin Motoring Atlas of Europe which shows existing or planned new motorways.

Data for spatial impacts should include at least the following:

A) Basic topographical information

- coastline
- Member States boundaries
- rivers
- wetlands
- geological exposures, geomorphological landforms
- cities/settlements (central point co-ordinates)
- TENs

This data would act as locational framework for the portrayal of other spatial datasets:

B) Environmental information

- climate
- forest area
- wetland areas
- internationally designated areas
(Ramsar sites, Special Protection Areas, Important Bird Areas, World Heritage Sites, Man and the Biosphere, Biogenetic Reserves and proposed sites)
- nationally designated areas
- CORINE Biotopes and land use cover

For global impacts, the environmental information should include data on air pollution, noise pollution, energy and aggregate consumption, and safety for each mode and each alternative to TENs. Traffic forecasts will be an important element of this. Indicative figures for these global impacts should be available for use by different computer models (cf section 2.2.4).

Although basic topographical information in digitised form is readily available for most countries, environmental information is far more difficult to obtain and often varies in quality.¹⁵

However, data on IBAs does cover Europe as a whole, detailing 2,444 sites. This not only covers their co-ordinates (which is the basis of Fig 3.1), but also information on the bird populations in each IBA. The IBA dataset used for this project was compiled in 1989 by Birdlife International (Grimmet and Jones 1989), and is currently being updated. Recent up-dates are in the process of being transferred into a database system due for completion by the end of 1997. This will affect the accuracy of the GIS calculations.

France is the only country which offers a complete dataset of digitised IBA boundaries, based on maps of their IBAs (Rocamora 1993). The Ligue pour la Protection des Oiseaux (LPO/Birdlife) and the French Secretariat pour la faune et la flore (SFF) have co-operated in producing this information. Most other European countries have detailed hard copy maps of IBAs.¹⁶

For other categories of protected areas, the situation is equally diverse. For example, English Nature, the UK Governmental organisation for nature

¹⁵ Data collection by different institutes and or countries implies that standards, and therefore quality, will vary. Data collected for the Corine Information System offers an example of this.

¹⁶ In the case of Greece, for example, the boundaries of several protected area categories, and IBAs, are still to be defined.

conservation, has digitised all its Sites of Special Scientific Interest. These tend to include most internationally designated sites.

The World Conservation Monitoring Centre (WCMC) is currently assessing the availability data on protected areas throughout Europe. This will provide an idea of existing and potential sources of GIS information.

Digitisation of the boundaries of all protected areas, both national and international ones, would allow a more accurate use of GIS to assess development impacts on nature conservation (cf section 2.2.4).

When the analysis is focused on the impact on protected areas, certain limitations must be recognised, notably the fact that some important areas are not protected. In the UK for example, the Special Protection Areas (SPAs) of the Wild Birds Directive 79/409/EEC can only be designated if already defined as Sites of Special Scientific Interest (SSSIs). However, many areas that are important corridors and transient areas for birds do not qualify as SSSIs and therefore cannot obtain the necessary SPA status.

Data showing protected areas boundaries should be connected to detailed information of the overall features of the habitats, species and vegetation types present (especially if included in the Annexes to the Birds and Habitats Directives, and in the IUCN red list of threatened future species). The CORINE Biotopes Sites data represents an attempt to provide this information 'for sites of major importance for nature conservation'. However, the quality of this data needs to be improved. A land cover dataset based on habitat types is also being developed by CORINE. It will include the following habitats: coastal, humid, grassland, forest, rocky, complex environments, urban environments, agriculture areas and miscellaneous (CORINE 1994). Hopefully the dataset will reflect the habitat types and the distinction between Community and Priority natural habitats, in Article 1(c&d) of the Habitats Directive 92/43/EEC.

Use of CORINE's habitat land cover could help to fill in the gaps in terms of either nomination or distribution of accurate and up-to-date information. Incompatibility between infrastructure and nature conservation values would be revealed by roads or railway lines affecting habitats included in Directive 92/43/EEC.

Finally, although this study only refers to the present Twelve Member States, an SEA of TENs should preferably include the three new members, joining the EU on January 1995. The recent Commission document on conventional railway infrastructure actually includes sections for Sweden, Austria, Finland, Norway and Switzerland (CEC 1994d).

Data on protected areas for nature conservation have important limitations. Differences in the degree of official recognition and definition of such sites, based either on national or international legislation, implies that datasets cannot be considered exhaustive. For example, EU Member States vary greatly in their implementation of the Wild Birds Directive 79/409/EEC. Certain countries might have designated only a small percentage of the areas which qualify as Specially Protected Areas. Alternatively, other countries might have designated large areas which, however, do not include the most important sites sometimes located in 'economically or politically sensitive' areas. Results should thus be considered carefully.

2.2.3 Relevant impact indicators

The scoping exercise refers to a list of generic impacts whose identification and description is based on general principles and past experience. The content and level of information of impact identification lists and matrices can be adapted from methodologies for project EIA.

An example of SEA is offered by the study by Research and Consulting Mens en Ruimte for the Commission (CEC 1993c), which produces a strategic and comparative assessment of the environmental effects of the High Speed Train Network. The study considers the following set of impact categories: spatial impact, primary energy consumption, air pollution, noise pollution and safety.

The following is an initial attempt to list those key elements of an SEA of TENs which the RSPB believes should be included. Tables 2.4 to 8 have an illustrative purpose only. They present a selection of impact indicators for TENs and intend to stress the need for alternative strategies.

Global Impact Indicators

The following impacts are not necessarily linked to a spatial dimension. They tend to refer to impacts on the quality of the environment as it affects the health and well-being of people, as well as having economic implications (eg traffic and time wasted on congested routes).

Ideally the alternative strategies (TENs is considered only one of the options) should be assessed in order to identify which contributes to reduce or increase the impacts identified. The five transport modes part of TENs are likely to have very different effects.

A better split between transport modes, taking into account their comparative advantages, would help to meet the EU's international obligations to reduce air pollution, and would reduce primary energy and aggregate consumption by the transport sector - meeting objectives 1, 3 and 4 of COM(94) 106 final (Table 2.1).

Table 2.4 Global Impact Indicators

Global Impact Indicators	Unit	Alternative Strategies				
		1 Trans-European Transport Networks				
		Roads	Rail	Inl.w.	Air	Sea
Air pollution						
• carbon dioxide (CO ₂) Total ¹						
• carbon dioxide (CO ₂) Relative ²						
• carbon monoxide (CO) Total						
• carbon monoxide (CO) Relative						
• nitrogen oxides (NO _x) Total						
• nitrogen oxides (NO _x) Relative						
• volatile organic compounds (VOCs) Total						
• volatile organic compounds (VOCs) Relative						
Primary energy consumption						
• annual consumption of fossil fuels Total						
• annual consumption of fossil fuels Relative						
Aggregate consumption						
• construction phase						
• maintenance phase						
Traffic						
Safety						

Footnotes:

¹ Total landtake by each mode² Relative figure for landtake based on different occupancy rates for each mode

Average occupancy rate is a key variable for several environmental impacts in the passenger sector of transport. This varies significantly between modes and is essential in intermodal comparisons (CEC 1992a; CEC 1993c). For example: land take by road will be assessed both in terms of total number of hectares and in terms of number of hectares per passenger/kilometre. The study therefore includes this variable and refers to the following occupancy rates (CEC 1993c):

motorway traffic	1.7 passengers/car
conventional rail	35%
High Speed Train	60%
aviation	60%

The analysis in Part 3 does not include global impacts.

Spatial Impact Indicators

The following impacts have a distinctive spatial dimension. They affect the natural, physical and cultural environment. The areas of habitat under each designation will, in many cases, overlap with areas under other designations.

Table 2.5 Spatial Impact Indicators

Spatial Impact Indicators	Unit	Alternative Strategies				
		1 Trans-European Transport Networks				
		Roads	Rail	Inl.w.	Air	Sea
Landtake						
Total (along all the length of the network)	area					
Internationally designated sites: risk of						
loss	area					
disturbance	area					
fragmentation	area					
overall area affected - total ¹	area					
overall area affected - relative ²	area					
Important Bird Areas	no. area					
Internationally designated sites: details						
total no. of sites potentially affected	no.					
total surface area	area					
Biosphere Reserves	no. area					
Ramsar sites	no. area					
Special Protected Areas	no. area					
World Heritage Sites	no. area					
Corine biotopes	no. area					
Proposed sites	no. area					
Nationally designated sites: risk of						
loss	area					
disturbance	area					
fragmentation	area					
overall area affected - total ¹	area					
overall area affected - relative ²	area					
Nationally designated sites: details						
total no. of sites potentially within corridors	no.					

Notes:

¹ Total landtake by each mode² Relative figure for landtake showing landtake per passenger - kilometre

Spatial Impact Indicators (cont'd)	Unit	Alternative Strategies							
		1 Trans-European Transport Networks	2 Reference scenario	3 Other scenario(s)	Roads	Rail	Inl.w.	Air	Sea
Secondary development									
Ecological impact									
Species likely to be affected :									
Birds Directive Annex I species	no.								
Habitats Directive listed species	no.								
Total	no.								
Habitats likely to be affected :									
coastal and halophytic habitats	area C ³								
coastal sand dunes & continental dunes	area P ⁴								
freshwater habitats	area C								
temperate heath and scrub	area P								
sclerophyllus scrub	area C								
natural & semi-nat. grassland formations	area P								
raised bogs, & mires & fens	area C								
rocky habitats & caves	area P								
forests	area C								
	area P								

Notes:

³ C (Community) refers to natural types of Community interest (Habitat Directive Article 1 c)⁴ P (Priority) refers to priority natural habitat types (Habitat Directive Article 1d)

Spatial Impact Indicators (cont'd)	Unit	Alternative Strategies				
		1 Trans-European Transport Networks				
		Roads	Rail	Inl.w.	Air	Sea
Hydrological Impact						
Groundwater :						
possible alteration of groundwater regimes in adjacent or nearby sites						
other						
Surface water						
sedimentation, erosion etc. as a result of stream channelisation						
pollution during construction or operation						
Geology & geomorphological impacts						
Noise pollution						
Landscape						
Culture/archaeology						

Landtake and ecological impacts are focused on the impact of alternative combinations of transport modes on physical and natural features which are significant for biodiversity. In particular, SEA of TENs should assess the impact on nature conservation sites (of international and national importance).

It is extremely important that attention is focused on the surface area affected and the type and importance of the habitat concerned, rather than on the simple number of sites potentially affected. Referring to the 'small percentage of sites within a certain category' (eg SPAs) as an indicator of an impact's significance is almost meaningless. Unfortunately, in this pilot project we have not been able to obtain much area data.

Hydrological impacts can affect widespread areas within watersheds. IBAs situated several kilometres downstream from a water course, which is being polluted by construction or operation of transport infrastructure, can be seriously damaged.

Such widespread damage from infrastructure development has been recognised as significant by the European Court of Justice in its judgement on the Marismas de Santoña. This states that the new road:

'means not only a significant reduction in the area of the Marismas de Santoña, but also disturbances affecting the tranquillity of that area, and, consequently, the wild birds protected under the directive' Judgement of the Court of Justice of the European Communities 2 August 1993 in the case C-355/90: Commission versus Kingdom of Spain (Santoña marshes).

Noise pollution and impacts on landscape and culture/archaeological features are important in terms of quality of life.

The analysis in Part 3 focuses on landtake and ecological impacts, with some reference to secondary landtake and hydrological impacts.

2.2.4 Impact prediction techniques

The characteristics of such complex and large scale programmes together with the relatively short time available for the analysis have led to the choice of a methodology based on Geographical Information System (GIS). It is worth highlighting here that the techniques suggested below are intended primarily to identify, and hopefully prevent, potential impact from TENs by informing decision makers. SEA should not attempt to address the same level of assessment requested in the EC Directive 85/337 on EIA. The nature of the appraisal of the impact indicators outlined above is necessarily broad brush.

It is assumed that before the construction of any new motorway or railway line is approved, detailed procedures for environmental assessment will be followed (although there are some problems with this assumption - see 1.3.2). This will ensure that complete information on the impacts of any proposal and on measures planned to minimise impacts will be available before taking the final decision.

The techniques adopted in this study relate to spatial impacts. However, a few suggestions on impact prediction techniques for global impacts are also included.

Buffer zones are a way of addressing potential spatial and ecological impacts of transport infrastructure. They involve creating a buffer or corridor around an area of particular interest either:

- assuming that impacts within that corridor will affect the area
- or assuming that the buffer area coincides or represents the area of interest itself.

Buffer zones category 1

Buffering is a technique which is increasingly adopted at the project-level EIA. For example, English Nature (EN) has encouraged the UK Department of Transport to collect and analyse environmental information along a 500 metre buffer (or corridor) on each side of a proposed route. It is also considering the opportunity of extending the size of the corridor to two kilometres each side,

‘A detailed survey of the ecological aspects of alternative routes, taking in a two-kilometre corridor on either side of the route, is recommended by English Nature in order to facilitate assessment of nature conservation impacts’ (EN 1994c)

in particular to account for hydrological impacts (EN pers.comm.).

An SEA of TENs, however, should not depend on standard EIA buffer dimensions. Mainly because of the geographical scale and the uncertainties linked to the networks.

Here two buffers are therefore developed along linear infrastructure (road and railway) to identify potential land-use conflict between transport infrastructure and nature conservation. The choice of the buffer size was influenced by two uncertainties: a) whether a particular segment falls into the category of new or

upgraded infrastructure (cf section 2.2.1), and b) the varying degree of accuracy in the location for the new infrastructure.

- The first buffer is a **ten-kilometre corridor** on either side of the road or railway line. Any nature conservation site within this range will be considered potentially at risk. We consider in this project that the surface area of the sites within the border represents the area of potential land-use conflict between transport and nature conservation.

The choice of a relatively wide corridor was judged necessary to include the uncertainty on the location of 13,329 km of planned new motorways and 656 km of planned new expressways (EC 1992e). It is assumed that the road or rail will eventually be routed somewhere within the buffer.

Also, a ten-kilometre corridor allows for further research into the potential impacts of secondary development (especially landtake). Key areas could include junctions and settlements within the corridor.

- The second buffer is a **two-kilometre corridor** on either side of the road or railway line. This is proposed as an area of potential environmental impact for new segments of motorway.

The corridor could be particularly useful for further analysis on the impact on nature conservation and rural areas resulting from fragmentation effect.

However, to be valid, the analysis would have to be based on the exact and definitive routes. The existing digitised data from EUROSTAT/GISCO does not offer this accuracy (cf 2.2.1).

Ideally a third buffer of possibly 500 metres should be created on each side of road segments planned to be upgraded. However, this has not been included in the analysis in Part 3 since the baseline information does not make the distinction between new and upgraded segments.

A study of the impact of transport in Northern France (Association Aménagement-Environment 1994) deals with similar uncertainties to those referred to above. It creates an alternative land cover map which identifies areas of non-compatibility (for their sensitivity for water management, nature conservation, tourism etc) where new transport infrastructure would have significant negative impacts.

This compares to English Nature's suggestion of incorporating environmental considerations through constraint mapping, i.e.. mapping identified environmental constraints within the area of search and overlaying them in order to identify areas of least constraint (EN 1994a).

The rationale behind the approach followed by this project (and by the French example) is based on the principle of preventing damage through an informed decision process. Although the baseline data available is incomplete, leaving a certain degree of uncertainty over impacts, the results from initial assessment should identify areas of potential conflict with the objectives of the programme.

SEA should be used to choose the alternative which will have the least bad impact on the environment. Or, in other words, which offers the best way of meeting all the key objectives of the programme or policy (in this case: TENs).

A limitation of the 'buffer zone' approach is that it will be unable to capture spatial impacts over a wider distance, particularly those falling under the categories of hydrological and geological impacts. Given the size of some of the components of TENs and the area they cover, they could affect entire ecosystems or physical processes, particularly those linked to wetlands. Computer models should be capable of addressing these impacts, describing dynamic processes acting over such a large area (EN 1994a).

In Part 3 a case study on France enables us to develop a first impression of the reliability or otherwise, of this technique. A comparison is made between the results of an analysis simply based described above and those of an analysis based on a different dataset.

Buffer zones category 2

Buffering the co-ordinate points of protected areas could be used to define spatial impacts with greater precision. GIS could be used to calculate the surface area of IBAs and other protected areas found in the twenty kilometre corridor described above.

The most obvious problem of the approach is that the shape of protected areas is never circular. So quantifying surface areas of protected areas within corridors does imply some level of inaccuracy.

The Ligue pour la Protection des Oiseaux (LPO/Birdlife) and the French Secretariat pour la faune et la flore (SFF) have provided us with the digitised boundaries for all French IBAs. This was used to replace the layer of IBA co-ordinates used for the general EU-wide analysis, and results were compared.¹⁷

The global impacts and computer modelling

A large number of computer models have been developed for modelling mobile as well as static sources of emissions. Noise and air pollution concentrations can be estimated. The study by ERM et al notes that:

'For most environmental pollutants emitted by traffic, changes in vehicle engine and emission control technology are forecast to result in reductions in emissions per kilometre travelled between now and 2010' (ERM et al 1994)

and suggests calculating emissions from road traffic based on traffic flows, journey lengths and speeds across the study area, using standard emission factors. Similarly, it should be possible to address the following issues in order to have at least some indication of the magnitude of TEN overall impact:

- landtake and pollution due to secondary development (possibly using major junction points and population distribution data to estimate development in the next 30-50 years)
- hydrological impacts (including both localised pollution due to construction works and the effects that these impacts could have several kilometres downstream on a wetland system, for example)

Broad indicative figures for certain impacts are suggested.

For example, in order to quantify landtake, the following figures could be used:

¹⁷ BirdLife (LPO) and SFF are currently investigating the possibility of digitising the borders of IBAs throughout the rest of Europe. This would involve a significant effort in order to collect the data on a uniform basis and digitise it with the use of GIS.

Table 2.6 Key figures for the calculation of landtake

		total cross-section (m)	surface (ha/km)
rail	classic	25	2.5
	AST upgraded	32	3.2
	HST new	35	3.5
road	2x1 traffic lanes	60	6.0
	2x2	90	9.0
	2x3	100	10
	2x4	120	12
air	total surface	variable	150-3000ha

Source: CEC 1993c

Two scenarios

GIS will produce separate data for each corridor type. Figures indicating the number and area of nature conservation sites potentially affected by TENs which fall within the twenty km-wide corridor will represent a worst case scenario. Those falling within the four km-wide corridor will be considered a best case scenario.

Findings based on incomplete information are intended to feed back into the design-process of the development under scrutiny as part of the normal process of environmental assessment (EN 1994a).

2.2.5 Alternative strategies

Development of alternative strategies should be centred on identifying which combination of schemes and policies might best meet the various objectives (ERM et al 1994) stated in COM(94) 106 final. Alternatives which produce a reduced impact on the environment should be central to the SEA. In Table 2.1 the Commission's proposal for TENs is considered Strategy 1. The Commission should propose a set of alternative strategies to develop the SEA and options should include the 'do nothing' alternative. If it fails to do so, the assessment will result in a far less dynamic process which simply examines the potential implications of a pre-defined network, rather than contribute to identify the best options.

A potential difficulty in choosing alternatives could derive from the limits of EU responsibility, particularly in the light of the subsidiarity principle. A significant part of transport strategies includes policies to manage traffic and demand involving, for example, changes to land use planning strategies. These would not lie within EU's responsibilities and could therefore be difficult for the Commission to consider them.

Nonetheless, the long term planning (up to 2010) involved in TENs suggests that there is scope for investigating the sensitivity of the strategies to a number of important variables. Some of the following were included the study by ERM et al (1994) and could be relevant to an SEA of TENs since they are also part of Community policy:

- user payments on the road network
- car fuel costs
- new air pollution targets
- improvements in vehicle engine and emission control technology
- different occupancy rates

2.2.6 Consultation

Consultation with interested bodies is essential at a strategic level assessment as it is for project-level EIA. The competent and relevant authorities, and the statutory and non-statutory input will allow to identify key environmental issues and sources of information to compensate for the impracticability of 'site visits'.

This pilot project, however, does not cover this issue.

2.2.7 Access to information

Freedom of access to information on the TENs should be guaranteed. It should in any case be available under Directive 90/313/EEC on the freedom of access to information on the environment.

3 TENs and nature conservation an initial analysis

3.1 The analysis

The technical work was conducted by the World Conservation Monitoring Centre, Cambridge (UK). GIS was used to combine road and railway TENs with topographical and environmental data for the EU, and overlay them. Buffers were added along either side of the planned road and railway segments. Computer modelling was used to calculate the number and estimate the surface area of nature conservation sites found within the two corridors.

The discussion of the evaluation is organised around the first of the seven objectives for TENs (Table 2.1). It questions whether the road and railway elements of TENs contribute to meet EU sustainable mobility and environmental objectives.

An attempt is made to present the magnitude or physical extent of predicted impacts in quantitative terms (eg number of protected areas and total surface area potentially affected). Where appropriate, these are placed in a national and EU context. Complex ecological impacts (eg. loss of biodiversity due to reductions in the size of habitat units, to isolation or fragmentation) are not assessed in section 3.2. However, some consideration to these impacts was given, primarily in qualitative terms, in the two case studies in section 3.3.¹⁸ Table 3.1 sets out some of the data sources used in this project, or that could be used to assess environmental impacts.

¹⁸ The UN/ECE report of SEA makes the following comment based on the Canadian experience: 'It is...better not to 'weight' criteria, unless there is sound justification and basis of measurement for doing so. Judgement, accompanied by written explanation, is not necessarily an invalid method of analysis. To create weighted criteria merely for the sake of providing a complicated and quantitative framework of analysis, which may look more authoritative, is misleading' (UN/ECE 1992).

Table 3.1 Summary and description of characteristics of the pilot GIS

Type of data	Brief description	Characteristics	Source	GIS used	Coverage	Principal limitations of dataset
Infrastructure						
Roads	TERN - existing and planned segments	Lines	EUROSTAT/ GISCO	Arc/Info	EU-twelve Member States	<ul style="list-style-type: none"> The data has not been validated by DG VII It fails to distinguish between new roads and roads to be upgraded The routes are not always accurate
Railways	High Speed line - existing and planned segments	Lines	EUROSTAT/ GISCO	Arc/Info	EU-twelve Member States	<ul style="list-style-type: none"> The data has not been validated by DG VII It fails to distinguish between new HS lines and lines to be upgraded The routes are not always accurate
Railways	Conventional line - existing and planned segments	Lines	EUROSTAT/ GISCO	Arc/Info	EU-twelve Member States	<ul style="list-style-type: none"> The data has not been validated by DG VII It fails to distinguish between new lines and lines to be upgraded The routes are not always accurate

Type of data	Brief description	Characteristics	Source	GIS used	Coverage	Principal limitations of dataset
Environmental data						
Important Bird Areas (IBAs)	See definition in Introduction See Fig 3.1	Point co-ordinates	Birdlife International Secretariat	Arc/Info	EU-twelve Member States	<ul style="list-style-type: none"> This is a 1989 dataset. The inventory has been updated since then. However, this information will not be available on database before 1996. Hard copy maps will not be available before 1997
Important Bird Areas in France	See Fig 3.2	Polygon data	SFF and LPO/Birdlife	Arc/Info	France	<ul style="list-style-type: none"> Habitats and species within the French IBA boundaries have not been inserted on a database to date
Ramsar sites	Based on the international Convention on Wetlands of International Importance Especially as Waterfowl Habitat - 1975	Point co-ordinates	WCMC	Arc/Info	EU-twelve Member States	
Special Protection Areas (SPAs)	Based on the Directive 79/409/EEC on the Conservation of Wild Birds	Point co-ordinates	WCMC	Arc/Info	EU-twelve Member States	
World Heritage Sites (WHSS)	Based on the International Convention concerning the Protection of the World Cultural and Natural Heritage - 1975 (WHSS)	Point co-ordinates	WCMC	Arc/Info	EU-twelve Member States	
Biosphere Reserves (MAB)	Based on the Man and the Biosphere Programme of UNESCO - 1970.	Point co-ordinates	WCMC	Arc/Info	EU-twelve Member States	
Proposed sites	Sites which have been officially recognised by Governments and are in the process of being designated. ¹	Point co-ordinates	WCMC	Arc/Info	EU-twelve Member States	
Corine biotopes	Based on the CORINE programme constituted by Council Decision - June 1985.	Point co-ordinates	WCMC and CORINE	Arc/Info	EU-twelve Member States	
Nationally designated sites	Sites which have been legally designated for conservation of nature at national level	Point co-ordinates	WCMC	Arc/Info	EU-twelve Member States	

3.2 The 'EU and member state level' approach

3.2.1 IBAs and road and rail networks

Table 3.2 Length of road and rail in the TEN

	Proposed	Existing	Total
Roads (km)	22,926	35,885	58,811
HS Rail (km)	6,917	17,286	24,204
CL Rail (km)	963	36,827	37,790

Source: Based on GISCO data

Fig 3.1 and 3.2 sets this road and rail network against Important Bird Areas (IBAs), first at a European level and then at Member State level, in this case France, as the IBAs of France have been digitised. While the graphical images simply illustrate the geographical location of possible impacts, Tables 3.3 and 3.4 give more tangible expression to the issue.

Table 3.3 Number of IBAs potentially affected by road and rail networks across Europe

Total number of IBAs in the EU: 2,444				
TENs	Number of IBAs within 10 km buffer	Percentage within 10km	Number of IBAs within 2km buffer	Percentage within 2km
Planned roads	240	9.8	42	1.7
Planned conventional railway lines	28	1.2	7	0.3
Planned high speed railway lines	41	1.7	8	0.3
Totals	309	12.6	57	2.3

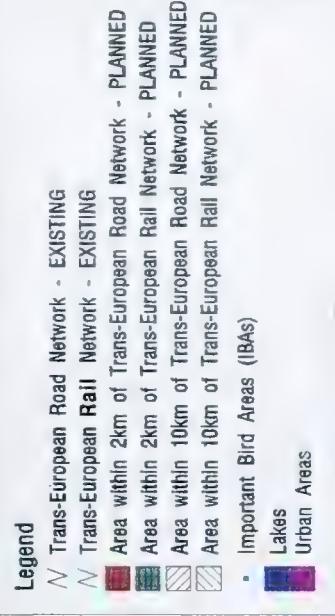
Source: WCMC

While it would be preferable to indicate areas of IBAs within the two buffers, this information is not yet available, as the boundaries for all EU IBAs have not been digitised.

The 57 IBAs within 2km of planned road and rail represent 2.3% of EU IBAs, and the 309 within 10km represent 12.6%. These figures include only those IBAs with centre points within 2 and 10km of the route. IBAs with centre points falling just outside these corridors are not included. Within France, the availability of digitised boundaries enabled us to use area figures. How this might affect the EU figures is not clear, but France has higher areas of IBAs affected than one would expect from the EU figures based on numbers of IBAs (see Table 3.4). 19.7% of the area of French IBAs is within 10km of planned road and rail developments, and 4.1% is within 2km. If the French figures are applied across the EU, significantly more than 309 IBAs would be affected - perhaps as many as another 150.

The Trans European Road and Rail Network and Important Bird Areas

Fig 3.1



Data Sources

IBA Information - Birdlife International

The Trans European road and railway networks in this map are based on digital information from EUROSTAT/GISCO. This digital information has no legal status. The official version, legally recognised by the Community, has been published in the Official Journal of the European Communities. (C220/8.8.94).

Projection : Lambert Azimuthal



The Trans European Road and Rail Network and Important Bird Areas in France

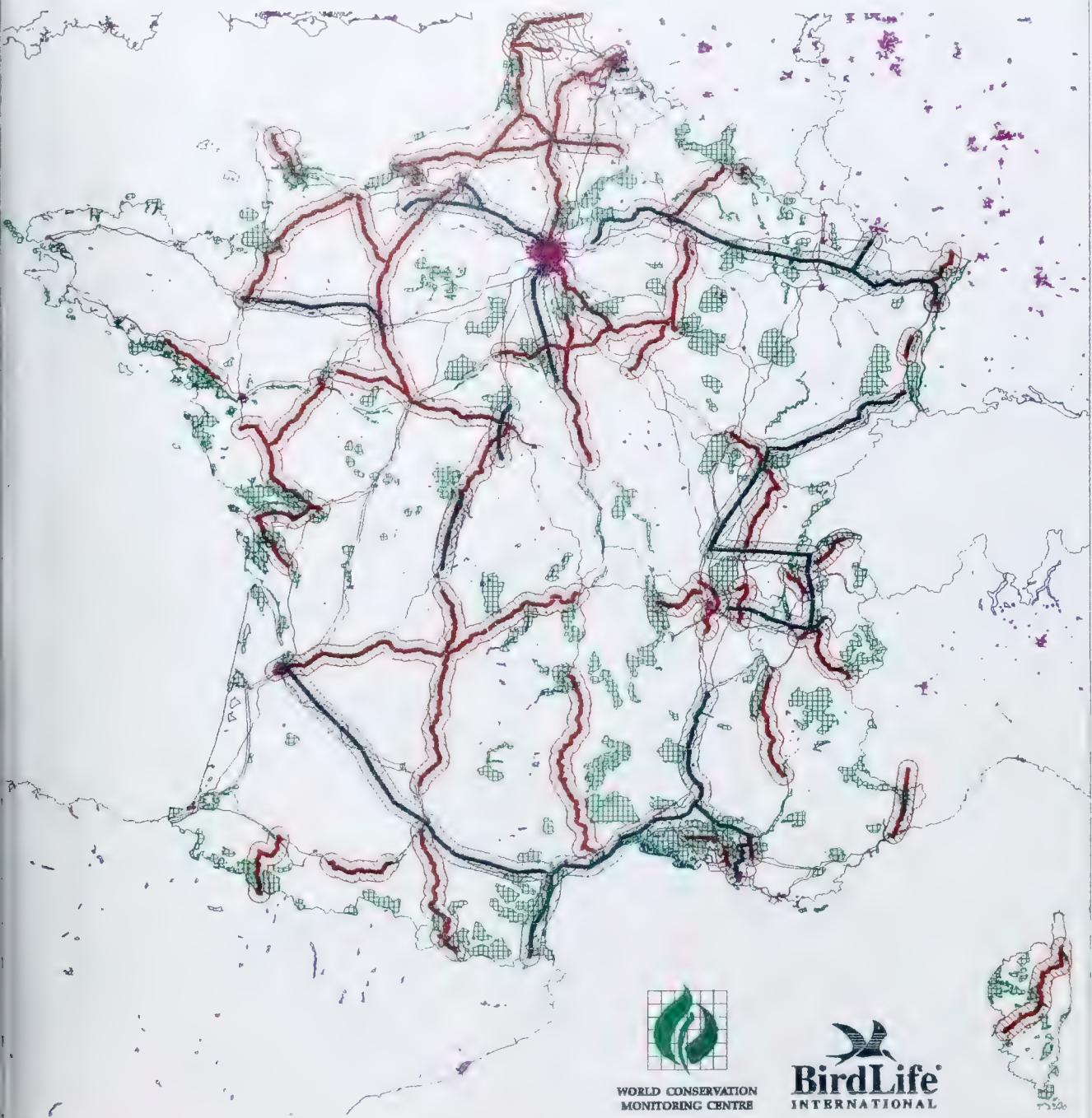


Fig 3.2

Legend

- ~ Trans-European Road Network - EXISTING
- ~ Trans-European Rail Network - EXISTING
- Area within 2km of Trans-European Road Network - PLANNED
- Area within 2km of Trans-European Rail Network - PLANNED
- Area within 10km of Trans-European Road Network - PLANNED
- Area within 10km of Trans-European Rail Network - PLANNED
- Important Bird Areas (IBAs)
- Lakes
- Urban Areas

Data Sources

IBA Information - LPO / SFF

The Trans European road and railway networks in this map are based on digital information from EUROSTAT/GISCO. This digital information has no legal status. The official version, legally recognised by the Community, has been published in the Official Journal of the European Communities. (C220.8.8.94).

Projection : Lambert Azimuthal

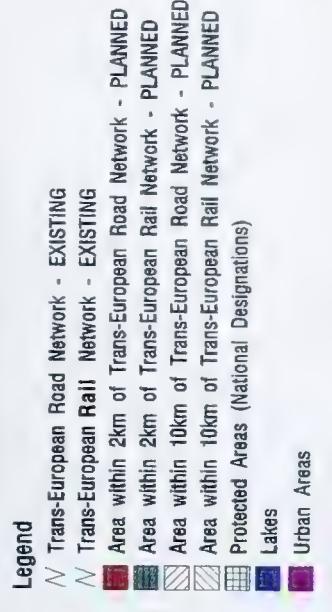


The Trans European Road and Rail Network and Protected Areas



WORLD CONSERVATION
MONITORING CENTRE

Fig 3.3



Data Sources

Protected Areas Information - WCMC

The Trans European road and railway networks in this map are based on digital information from EUROSTAT/GISCO. This digital information has no legal status. The official version, legally recognised by the Community, has been published in the Official Journal of the European Communities. (C220.8.8/94).

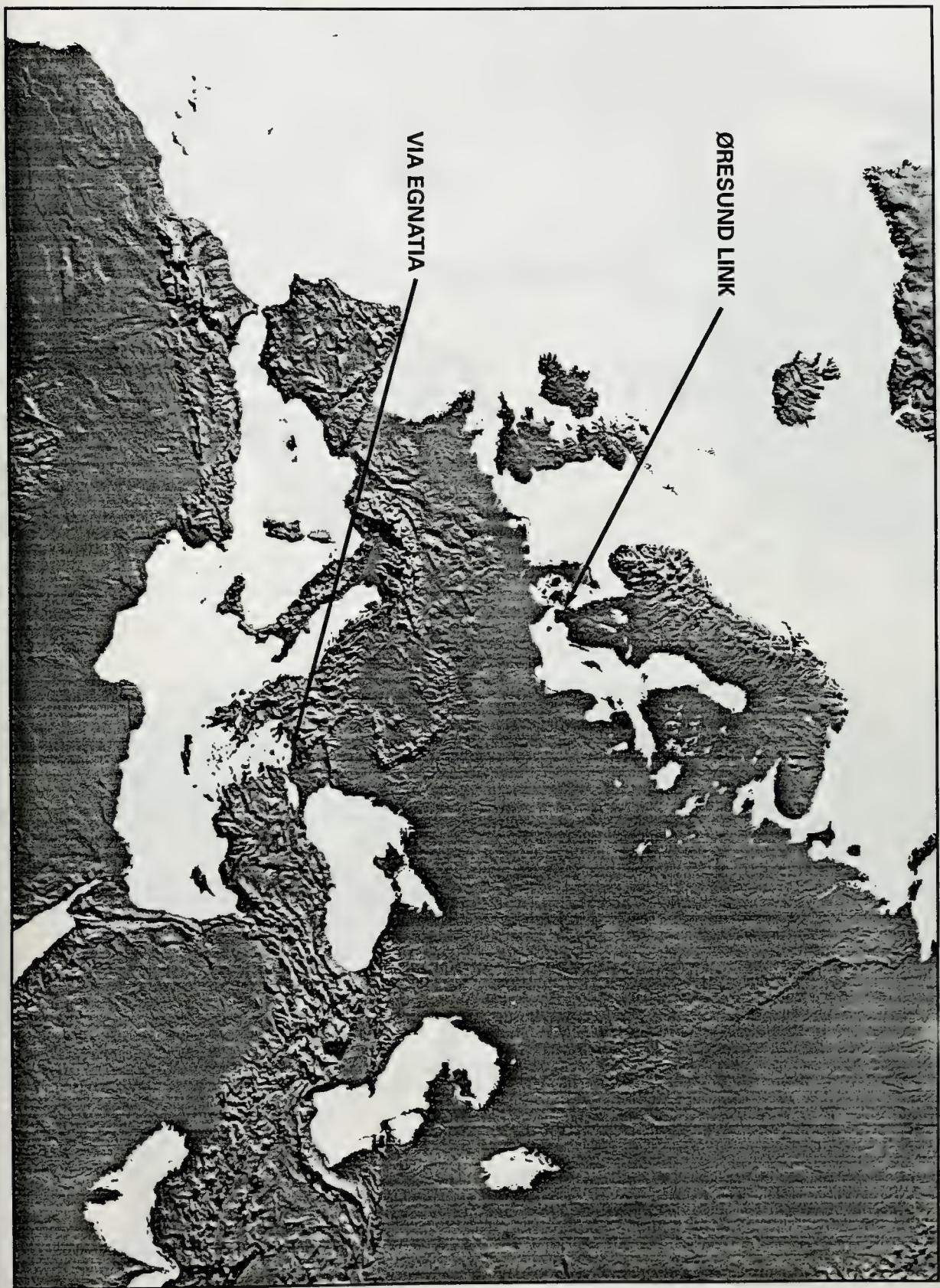
Projection : Lambert Azimuthal





Fig 3.4

EUROPE - Showing location of Øresund link and via Egnatia



VIA EGNATIA - From Igoumenitsa to Alexandroupolis



THE ØRESUND LINK

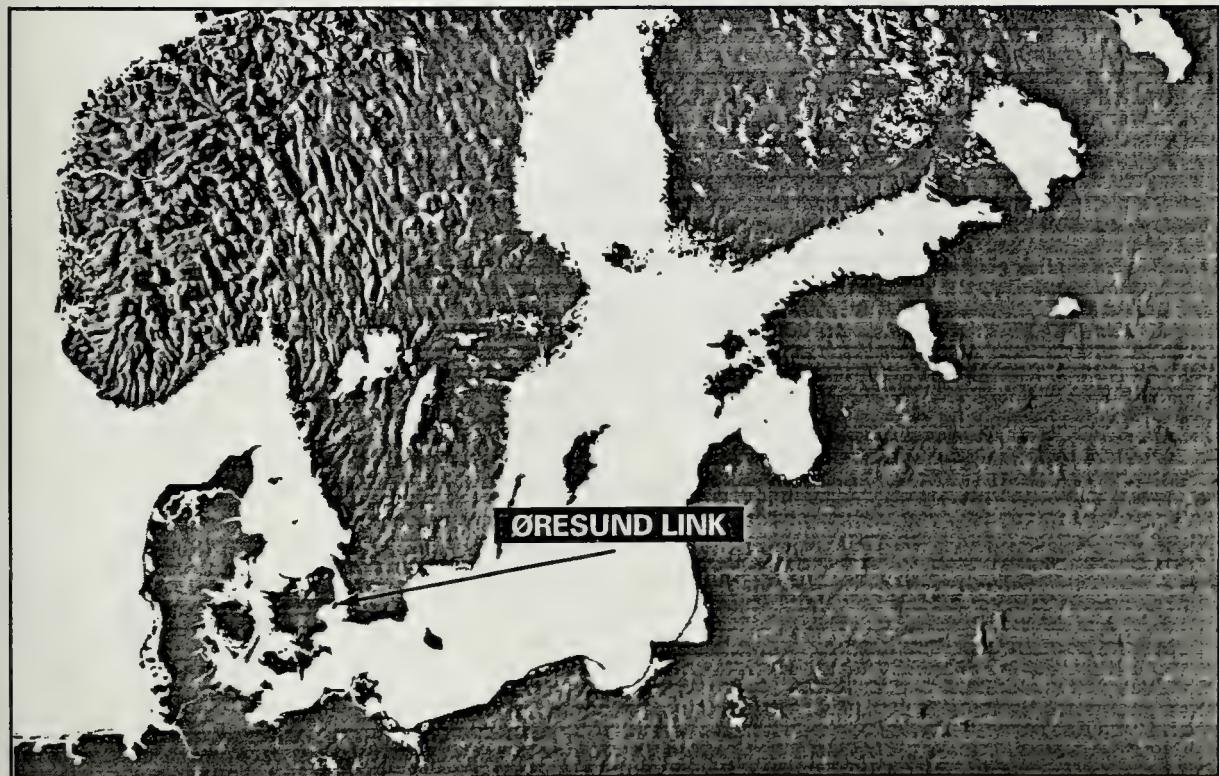


Table 3.4 Area within IBAs potentially affected by road and rail networks in France

Total land area of IBAs in France: 47 325 km²				
TENs	Area of IBA within 10 km buffer (km ²)	Percentage within 10km	Area of IBA within 2km buffer (km ²)	Percentage within 2km
Planned roads	6,570	13.9	1,192	3
Planned rail	2,765	5.8	731	1.6
Totals	9335	19.7	1932	4.1

Source: WCMC

From these maps and tables, it is clear that TENs will be developed close to many EU IBAs, and thus could have a significant impact on European nature conservation.

3.2.2 Nationally designated areas and road and rail networks

Fig 3.3 and Table 3.5 show the proximity of TENs to nationally designated sites - defined in Table 3.1. This shows even more worrying figures of 8.3% within 2km of a planned road or rail development, and 33.8% within 10km.

Table 3.5 Nationally designated sites potentially affected by the planned road network

	No. of sites	Area of sites (km ²)	Area within planned road buffers (km ²)	Percentage of total area within planned road buffer
All known sites	18,646	234,711		
Within 2km buffer	141	58,927	4,871	8.3%
Within 10km buffer	411	76,738	25,961	33.8%

Source: WCMC

3.2.3 Conclusions

A road or rail development going close to, or even through, an IBA or protected area, does not necessarily damage the nature conservation interest of that site. However, enough concern has been raised about transport infrastructure and biodiversity (see for example RSPB 1994), that questions need to be asked.

Issues such as the effect of transport infrastructure on sensitive habitats, habitat fragmentation, local pollution from salt or ozone, and more widespread pollution, such in watercourses above wetlands, must be addressed. In addition, other wider issues such as nitrate pollution from vehicles and carbon dioxide emissions must also be faced in EU policy.

It is important to note that more than one designation type can apply to the same nature conservation site. For example, an IBA often includes one or more of the following:

- Ramsar sites
- World Heritage sites
- Special Protection Areas
- Proposed Special Areas of Conservation
- Nationally protected areas

3.3 The 'programme level' approach - two case studies

This section focuses on two schemes part of TENs:

1. the Øresund fixed rail/road link between Denmark and Sweden
2. the Via Egnatia motorway in Greece.

Both are included in the Christophersen list of eleven transport projects which received priority status at the Corfu European Council (July 1994, cf section 1.3.2).

The case studies are based on the work of the Birdlife partners in the two countries affected: Danish Ornithological Society (Denmark) and Hellenic Ornithological Society (Greece).

3.3.1 The Øresund Link

A Introduction

This case study examines the potential impact on IBAs by a major engineering project: the Øresund fixed link between Denmark and Sweden. This will be a combined four-lane motorway and two-track electrified rail link between Copenhagen and Malmö.

The Øresund Link is one of the Eleven Priority Projects (cf. section 1.3.2) approved at the Council of Ministers Corfu Summit in July 1994. Approval of the project will be sought and EU funds will be readily available. Work on bridge approach commenced in mid-1994.

The case study summarises briefly the main criticisms raised against environmental impact assessment procedures. It concludes that shortcomings in the process have led to significant risk of damage to the Saltholm Special Protection Area (SPA), classified in terms of Article 4 of Directive 79/409/EEC on the conservation of wild birds.

B The assessment of environmental impacts

An inter-governmental agreement on the fixed link between Sweden and Denmark was signed in March 1991. The Danish Parliament approved the necessary legislation in August of that year. Both the agreement and the statute included a condition whereby the competent authorities in Sweden and Denmark would co-operate over resolution of environmental questions, insofar as that might prove necessary.

A large number of environmental studies have been carried out, assessing physical and biological conditions in the Øresund. An international panel of experts was appointed, and its evaluations and recommendations contributed to a consultation document 'Environment Øresund Shore to Shore Link 1993' (Øresund Consortium 1993a). Their work also contributed towards minimising environmental impacts of construction.

The consultation report mentioned above was the basis for a public hearing in May-July 1993 on environmental quality objectives and the related control and monitoring programme. A Supplementary Hearing Report was produced later that year (Øresund Consortium 1993b), to present the result of additional research on technical possibilities for the environmental optimisation of the fixed link.

The following is a summary of the major weaknesses of the EIA process as it applies to the Øresund Link:

The Environmental Statements

Documents produced by the Danish authorities and those of the international panel of experts focus much of their attention on modelling and forecasting hypothetical changes to the physical and chemical environment of the Baltic Sea. Only limited attention is devoted to material impacts on areas of the Øresund adjacent to the construction works. Unarguably, negative impacts will certainly be experienced in these areas. Danish NGOs, including the Danish Ornithological Society (DOF), have argued that equal if not greater efforts should have been made to assess and mitigate localised impacts.

The two sets of environmental quality objectives, one for the Baltic and one for the Øresund, presented in the 1993 Reports (Øresund Consortium 1993a and 1993b) illustrate this focus:

The objective for the Baltic (I) is extremely demanding,

‘The Øresund Fixed Link must not affect the Baltic. This means that no change in the physical and chemical marine environment, and thus the biological marine environment in the Baltic, may result from the Øresund Fixed Link’ (Øresund Consortium 1993a);

while the one for the Øresund (II) accepts a certain degree of both temporary and permanent damage to the area:

‘The Øresund Fixed Link may only temporarily create conditions which are in contravention with the objectives and criteria that have been set out in Danish regional plans.

However, permanent as well as temporary effects are accepted in a specified area around the construction and dredging areas.

The necessary requisitioning of areas for the construction of the artificial peninsula, artificial island and bridge piers, and a permanent effect as a result of local changes in hydrographic conditions, are acceptable’ (Øresund Consortium 1993a).

The potential adverse impact on birds and their marine habitats has clearly been dismissed. The report considers it ‘impossible’ to avoid damage caused by construction works to marine areas around Saltholm, classified as a SPA. However, one must conclude that such impossibility results from the Government’s choice to reject the consideration of a coast-to-coast tunnel option (see below) which would have made it possible to avoid damage to the SPA.

The Treatment of 'Alternatives'

Alternatives studied are essentially a series of construction variants combining the individual civil engineering elements in various ways and aimed at reducing dredging quantities and water flow resistance (Øresund Consortium 1993b). The alternatives to minimise the Link's environmental impact allow very little consideration for the protected area of Saltholm.

The environmental statements fail to consider other real alternatives such as a coast-to-coast tunnel, which excludes the construction of the island and bridge, and a 'do nothing' option. A request for an evaluation of the tunnel solution was presented by several NGOs.

This merited only a simple mention in the introductory section of the early assessment document, was soon ruled out by the Government on economic grounds and never fully considered in the EIA process (DOF, pers. comm.).

Non-Statutory Consultative Input

The Danish Government did not request comments from non-statutory consultative organisations, including environmental NGOs. Following the approval of the inter-governmental agreement in 1991 DOF presented a complaint to the Commission of the European Communities (CEC). This expressed serious concern about the potential for negative impacts on the Saltholm SPA (see below). As a result, the CEC asked the Danish authorities to seek active involvement of NGOs in the process of assessment. This never happened.

By 1992, Danish newspapers (eg Jyllands-Posten) reported comments by CEC officials, which seemed to oppose the Øresund Link project on environmental grounds. However, it is apparent that political pressures brought this process to a halt (DOF, pers. comm.).

As a result DOF raised a civil case against the Danish Government based on the violation of the Birds Directive. The case under appeal in the Superior Court, following a judgement in a lower court which ruled that DOF has no locus standi to bring a court action on this matter. If the Superior Court recognises DOF's right to raise the case, this will be presented to the European Court of Justice.

Over the three years of debate, changes to the project design have reduced the potential impact on the environment generally. Most of these changes result from attention given to the perceived primary objective of limiting damage to the Baltic Sea's physical and chemical environment. Impacts on bird populations remain significant, attributable to the Danish Government's failure to implement linked economic, technical and environmental feasibility studies before making a political commitment to the bridge option.

C Impact on IBAs

The Øresund Link will affect the Saltholm SPA. The following birds are considered potentially at risk (DOF, pers. comm., based on Heath and Tucker 1994):

- 40,000 breeding water fowl
- 15,000 breeding common eiders (*Somateria mollissima*), representing the biggest breeding colony in Europe
- up to 3,500-4,000 moulting mute swans (*Cygnus olor*)

- 9,000 moulting greylag geese (*Anser anser*), representing the second most important moulting area in Europe
- up to 200,000 migrating waterfowl, of which:
 - 10,000-50,000 wintering tufted ducks (*Anas fuligula*)
 - 3,900 teals (*Anas crecca*)
 - up to 3,800 cormorants (*Phalacrocorax carbo*)
 - up to 2,800 barnacle geese (*Branta bernicla*)
 - 3,800 wigeons (*Anas penelope*)
 - 300 shovellers (*Anas clypeata*)

The Report (Øresund Consortium 1993b) focuses on two factors connected to the construction of the Link which it considers likely to affect birds:

- a reduction of food resources due to permanent reductions in the benthic flora and fauna, and temporary reductions resulting from siltation
- b) the disturbance caused by the construction work south and west of Saltholm, which is expected to be temporary, and to be 'minimal' after completion.

It then lists the predicted impacts:

- According to which construction variant will finally be chosen, excavation might take place in the sensitive area south of Saltholm. A 'small' area in the most southern part of the designated Special Protected Area around Saltholm will be affected by the alignment. The area was originally 3.2 km², but it was subsequently reduced to 2.4 km² (3.3% of the total area of 72.6 km²) in the optimised version of the base project (referred to as Project KM4.2).

NB : The figure of 3.3% is not based on an accurate calculation of the surface area affected. It refers only to a part of it south of the bridge, away from the SPA. Even if the Link were to cause the loss of 3.3% of the total area of an SPA, this should still be regarded as a significant impact in ecological terms rather than a 'small impact'.

- Sediment spillage resulting from construction of the base project was estimated at around 100,000 m³. The three alternative variants average between 195,000 and 270,000 m³. For all options, the largest deposits of sediment are expected in the area north of the Middelgrunden and Saltholm Shoals. 'The quantity will vary depending on the earth quantity and dredging methods' (Øresund Consortium 1993b).

- Impacts on coastline morphology will include the fact that 'the artificial island south of Saltholm will provide shelter from direct wave and current impacts on the south coast of Saltholm. This will cause the coastline to change from one with a great deal of sand conveyance, to more of an overgrown coastline with less sand conveyance and gradual deposition of sand and finer sediments, as well as organic material'. It is suggested that this may result in more favourable conditions for wading birds.

NB: Experience elsewhere shows that predictive techniques for modelling the movement and settlement of fine organic sediments disturbed by construction works are unreliable. Consequently no certain conclusion can be drawn in respect of conditions created for wading birds.

- Between 2.5 and 1.7 km² of grass wrack will be lost to land-take.
- An aggregate area of 5.6 km² of the seabed with mussel populations will be

removed. After the construction period, the mussel banks are expected to regenerate.

NB : grass wrack and mussels provide important food resources for mute swans and common eiders respectively (Cramp 1977-1993)

- The report then claims that the possibility of a 'small permanent reduction in the number of moulting swans cannot be excluded'. The moulting concentrations of mute swans on Saltholm are internationally important. In 1993 a maximum of 2,700 swans were counted. This represents over 50% of the total swan numbers using the Øresund area (NERI 1991a).

The base-line study points out that 'Low levels of disturbance are unlikely to cause an immediate and complete abandonment of the site because of the flightless nature of the swans but may trigger a subsequent delayed response, perhaps resulting in the site not being used in future years' (NERI 1993a).

NB: It should be noted that were a delayed response to happen this would result in a much more significant loss than that recognised in the Report.

- A prolonged or permanent reduction in the number of moulting greylag geese is expected, together with a temporary reduction in the number of breeding eiders on Saltholm resulting from noise disturbances during the construction period. This reduction, it is said, should not exceed 25% of the total population size, 'according to the defined criteria', which are not further explained in the Report.

The report for the Supplementary Hearing suggests that 'in the event of the bridge construction work having a negative effect on bird life on Saltholm' alternative localities will be considered by way of compensation. The report further states that alternative locations have been evaluated and defined as feasible for use by moulting mute swans, and for migrating waterfowl, but no evidence of such evaluation is found in either base-line study or reports.

NB: Acceptance of damage to a SPA must not be tolerated where an alternative non-damaging solution exists - in this case the coast-to-coast tunnel option. This is the true 'alternative locality'. As to unspecified alternative localities for displaced mute swans or migratory waterfowl, no guarantee is given that such birds would use those areas. In principle, recognition of the problem and genuine attempts to mitigate its unwelcome effects might be tolerated, but only if certain legal tests can be satisfactorily applied. Satisfying the ninth recital and Article 4.1 of Directive 79/409/EEC and the new provisions of Directive 92/42/EEC are crucial factors. That is, any mitigatory measure for species of birds so affected must ensure 'their survival and reproduction in their area of distribution' and the coherence of Natura 2000. In the present case, only casual expressions of hope are offered by the government authorities instead of affirmative species recovery plans. This is insufficient to meet the legal requirements of Directive 79/409/EEC as amended by Directive 92/43/EEC.

The following is a list indicating the level of damage to wildlife populations acceptable to the authorities in ensuring compliance with the imposed environmental quality objectives I and II.

'A temporary reduction of one quarter in the population of breeding eiders on Saltholm is acceptable. The population must be restored no later than five years after completion of the construction works.

'The number of other breeding birds on Saltholm must not be reduced as a result of the construction works.

'A temporary reduction in the number of feeding and resting birds of passage on Saltholm as a result of the construction works is acceptable. However, it is a condition that the number of feeding and resting birds of passage is restored no later than two years after completion of the construction works.

'For greylag geese and mute swans the risk of a permanent reduction in the number of moulting birds is acceptable.

'It is acceptable that the seal population on Saltholm may disappear in connection with the construction works, and that it may not be possible to restore it' (Øresund Consortium 1993a).

D Discussion and conclusions

The Øresund Link is another example of the danger to nature conservation from transport infrastructure developments, which was clearly highlighted in the Fifth Environmental Action Programme (Section 5.3).

Part 1 of this report introduces the concept of environmental limits to development as an essential element of integration and sustainability. When referring to the local impacts in the Øresund, the criteria established by the Øresund Consortium reflect this concept only very weakly. Essentially, they promulgate an infringement of Article 4.4 of Directive 79/409/EEC, notwithstanding the extra latitude provided by Articles 7 and 6.4 of Directive 92/43/EEC on the conservation of habitats and of wild fauna and flora.

It is only theoretically possible that numbers of individual bird species depleted as a consequence of construction operations might return to previous levels. Equally they might not. Other uncertainties are postulated in the impact studies, for example that mute swans may totally abandon the area under pressure of disturbance. It is argued here that an EU Member State must not accept such risks in a Special Protection Area classified under Article 4 of Directive 79/409/EEC, without providing guarantees in advance that successful recovery programmes can be implemented for depleted bird populations.

The one solution to this dilemma which has not been adequately tested in pursuit of SEA principles is a genuine, open assessment of the coast-to-coast tunnel option.

The current EIA process in Denmark is fundamentally flawed, as it places the burden of proof of environmental damage on dissenting parties. Non-governmental organisations such as DOF argue that it should be the responsibility of developers to prove no net loss of natural assets, especially in terms of damage to protected areas such as SPAs.

3.3.2 Via Egnatia

A Introduction

TEN routes within each Member State are the responsibility of the national Government. The Networks are the result of a combination of suggestions, based on national requirements and priorities, presented by the responsible authorities in each country (cf section 1.3.1).

This case study briefly reviews the main characteristics of the transport sector in Greece, including the EIA process for transport projects, in order to present the background against which the Greek TERN is being developed. This should highlight the difficulties Greece could have in meeting the environmental objectives of TENs (cf. Table 2.1).

A few examples provide an insight into the environmental implications of TERN. A review of several environmental impact statements for segments of Via Egnatia suggests that virtually account has been taken of cumulative impacts. This supports the urgent need for Strategic Assessment of the environmental, social and economic implications of TERN, which should be a pre-condition to its final approval and development.

B The Via Egnatia scheme in the Greek context

The TERN in Greece is centred on two large schemes:

- the Patras-Athens-Thessaloniki-Greek/Bulgarian border motorway (PATHE)¹⁹ and
- the Igoumenitsa-Thessaloniki-Alexandroupolis motorway (Via Egnatia)

These are intended as 'a backbone for the Greek motorway system' and are considered 'crucial to the transport infrastructure development in Greece...[Connecting] the isolated Union member state with all its neighbours: Albania, Bulgaria, the former Yugoslavia and Turkey. Via connection to sea ports, it makes relations with Italy possible (i.e. rolling road Igoumenitsa-Italian ports)' (Christophersen 1994).

The development of transport infrastructure has been justified by the Greek Government in strategic (and military) terms. And indeed, a quick glance at a European road map is sufficient to indicate the significant gap between Greek's road network and that of richer European countries such as France, the UK, Germany and Italy. In these countries, motorways connect all important cities. In Greece the extent of the existing motorway is very limited, i.e. between 100 km and 180 km.²⁰ This figure, however, should be considered carefully, since Greece has approximately 2170 km of roads with four or more lanes (in single or dual carriageways; including the 180 km of motorway (Hellas 1994)).

Here are a few international comparisons:

- The surface area of Greece is three times greater than that of Denmark, has double the population, while its population density is 35% lower. Nonetheless, the motorway network in Denmark is seven times that of Greece (700 km and 100 km respectively), and the density of its road network per square kilometre is almost double that of Greece.
- Portugal, which has only 19 000 km of roads compared to the 116 000 in Greece, still has 500 km of motorway, i.e. five times more than Greece.

The situation for the railway network is possibly worse:

- In terms of network density per 1000 square kilometres, the UK is 3.6 times higher, Denmark and France are three times higher, and Spain is 1.4 times higher (and has a surface area almost four times bigger than Greece).

¹⁹ The new PATHE motorway (860 km long) belongs to a corridor which crosses several European cities and goes to Germany. Of the 860 km, 200 km have already been completed and 100 km are at present under construction (Christophersen 1994).

²⁰ The Greek motorway covers approximately 180 km according to the Euro Atlas - Hellas (Hellas 1994), or 100 km according to the international comparisons in the 1994 Transport Statistics by the UK Dept. of Transport. In any case, the motorway does not connect Athens to the second major city in Greece: Thessaloniki.

Finally, if we consider the percentage of freight moved by rail:

- The freight moved by rail in Greece is 4.8% of that moved by road, in Spain this percentage rises only slightly, to 6.2%, in the UK to 12.7% and in Denmark to 18.3%. France shows a significant difference, with 43% of its freight being carried by rail.
- Current journey times from Thessaloniki and Athens are about six hours. And there are technical obstacles such as the fact that the Athens-Patra line uses a metric gauge, whilst the rest of Greece has a standard European gauge.

Together, the two new motorway schemes would add 1640 km (PATHE - 860 km; Via Egnatia - 780 km). There is no evidence that this scheme is part of a wider, strategic understanding of what the overall transport needs of the country are and will be. A clear transport policy based on objectives and targets would make it easier to identify sustainable solutions for this important sector.

The two schemes have been included in the Report of the Chairman to the Corfu European Council (Christophersen 1994), based on the work of the Christophersen Group (cf section 1.3.2). The Via Egnatia undoubtedly meets some of the eight criteria adopted by the Group to identify priority projects. It is of exceptional scale and Table 3.6 shows that the scheme can satisfy at least a second criteria: that 'the project should be mature'.

- 26% has been completed or constructed before the scheme was included in the TERN (7 sections out of 27)
- 18.5% is almost completed (5 sections out of 27)
- 15% is under construction or one corridor has been completed (4 sections out of 27)

(NB the sum of percentage figures does not add up to 100 because certain sections fall under two or more stages of implementation):

The remaining 65.5% of the scheme falls within various stages of technical studies being submitted and site being approved (18 sections out of 27).

However, it is far harder to assess whether the scheme fully complies with EU environmental legislation (the last criteria of the list). The following sections question this and address the question of whether the scheme meets or is in conflict with key objectives identified in Table 2.1.

C The assessment of environmental impacts

The Via Egnatia motorway was planned as a dual two-lane motorway which including 'long tunnels and large bridges' for the mountainous section between Igoumenitsa and Thessaloniki. The state of implementation of the Via Egnatia varies according to which section is being considered. Table 3.6 above summarises the present situation (Hellenic Ornithological Society pers. comm.).

The summary (Table 3.6) shows how the EIA process and resulting statements actually refer only to sections of the Via Egnatia as opposed to the whole scheme (780 km), and that the average of these sections is 25 km, i.e. only 3.2% of the overall length (from a minimum of 10 km to a maximum of 40 km (Hellenic Ornithological Society pers. comm.).²¹ This suggests approximately 30 Environmental Statements for a single scheme.

²¹ The national legislation implementing the EIA Directive 85/337/EEC was approved only very recently (in 1990). Official guidelines for Annex 1 road and railway EIAs have been produced and will soon be made into a Circular. However, these fail to mention the need to examine road schemes as a whole.

Table 3.6 Summary data on EIA and implementation of Via Egnatia

Source: HOS pers. comm. (NB at the time of writing further data is being collected)

Notes:

- 1 The section between Kidi and Kouloura had been completed before the definition of the *Via Egnatia* scheme.
- 2 Though not related to TBAs, this area is of vital importance for other aspects of nature conservation: the Greek bear population

The legend for 'Stage of implementation' is overleaf

Legend for Table 3.6

A = completed or constructed before the definition of the Via Egnatia Scheme

B = almost completed

C = under construction or one corridor finished

D = site has been approved and technical studies are now being prepared

E = the site has been decided

F = technical studies have been submitted, but no decision has been made yet

The following is a summary of the major (but by no means all) weaknesses of the EIA process as applied to the Via Egnatia (Hellenic Ornithological Society 1994):

Inconsistencies in the EIA process

The siting of a project is approved on the basis of partial environmental information and a questionnaire which effectively acts as a pre-environmental statement

The Environmental Statement is produced only after the site has been approved, and should propose mitigation strategies which are amended and/or approved by the Ministry of Environment, Planning and Public Works (EPPW).

The Environmental Statements

In general the statements appear to be very bulky and difficult to use, whilst the summaries tend to be too general to be of any help.

On examining four Environmental Statements for sections of Via Egnatia it was found that the private consultancies responsible for the work were composed primarily of engineers, with no representation of environmental or nature conservation interests. Furthermore, the quality of the statements varied significantly.

The treatment of 'Alternatives'

Alternative locations are considered in the first stage of the process (when the siting is decided) and only in a more formal way in the Environmental Statements. These however, are limited to present alternative routes rather than real alternatives such as different modes or demand management approach as opposed to infrastructure development to accommodate demand

Non-statutory consultative input

Consultation with NGOs has been limited to one group of NGOs working on the LIFE Programme ARCTOS, for the protection of bears. This, however, should be considered a positive sign since it will pave the way towards increasing collaboration along these lines. In this case, the NGO was contacted on the impact of the Grevena, Panagia and Peristeri section on the Bear Areas. This approach was considered necessary in order to avoid difficulties in a later stage of implementation, which would otherwise be an obstacle to the urgent completion of the project.

Section-level approach to EIA

The vast number of sections and EIAs for Via Egnatia have made it very difficult for the Ministry to identify the siting. For example, for the sections between Kipi-Alexandroupoli-Makri (less than 60km), which are likely to affect the IBA of the Evrou Delta, four Environmental Statements are likely to be produced.

The need for SEA

The piecemeal approach described above has three fundamental limits which make it impossible:

1. to consider cumulative effects of transport infrastructure developments, and
2. to address questions like the role of infrastructure in determining the overall level of demand for transport, or the relative role of different transport modes and the relationship between transport and land use patterns (IEEP 1994a).
3. to consider the overall impact on one IBA or on a sensitive area for nature conservation.

These issues represent the backbone of a sustainable transport programme. Thus, the urgent need to apply SEA to a scheme of 'exceptional scale' (as defined in Christophersen 1994) such as the Via Egnatia cannot be overemphasised.

It is extremely important to emphasise the need for an overall study which assesses the impact of TENs on IBAs and other nature conservation areas (such as the Bear areas) and examine or evaluate alternative solutions, including alternative routes and transport modes.

D The impact on IBAs

The piecemeal approach to the environmental impacts of the Via Egnatia has made it very hard to assess the overall impact on the nine IBAs involved. Hellenic Ornithological Society reports a significant lack of data (Hellenic Ornithological Society 1994). A great deal more work is needed to establish the environmental impacts, including:

- The impacts of roads around Lakes Volvi and Langada, one of 11 Greek Ramsar sites and an SPA, with 204 species of birds recorded, 36 of which are protected under the Wild Birds Directive. The proposed route is as close as 500m from Lake Langada, and completes the ring of motorways around Lake Volvi itself.
- Alternatives to the route across Xiropotamo, part of the Vistonida IBA, so as to recommend another route.
- The potential pollution from service stations
- Some baseline data gathering, using unpublished data from HOS and its members to examine and assess the impacts of the Via Egnatia.

4 Conclusions

This report illustrates the potential impacts of TEN on nature conservation, using IBAs and nationally designated areas as examples. It also attempts to explore the possibilities of using a GIS-based approach to assess the environmental impact of the Trans-European Networks. While many of the conclusions must be based on assumption, as we have not devoted the time or resources to answering every question, two key points can be made:

A The potential environmental impacts of the TEN are serious, as illustrated by the fact that so many IBAs and nationally designated sites are close to road and rail developments:

- more than 12% (309) of EU IBAs are within 10km of planned road and rail developments
- more than 2% (57) of EU IBAs are within 2km of planned road and rail developments
- nearly 20% ($9,335\text{km}^2$) of the area of French IBAs are within 10km of planned road and rail developments
- more than 4% ($1,932\text{km}^2$) of the area of French IBAs are within 2km of planned road and rail developments
- more than 33% ($26,000\text{km}^2$) of the area of nationally designated sites in the EU is within 10km of planned road and rail developments
- more than 8% ($4,900\text{km}^2$) of the area of nationally designated sites in the EU is within 2km of planned road and rail developments

A road or rail development going close to, or even through, an IBA or protected area, does not necessarily damage the nature conservation interest of that site. However, enough concern has been raised about transport infrastructure and biodiversity (see for example RSPB 1994), that questions need to be asked.

Issues such as the effect of transport infrastructure on sensitive habitats, habitat fragmentation, local pollution from salt or ozone, and more widespread pollution, such as in watercourses above wetlands, must be addressed. In addition, other wider issues such as nitrate pollution from vehicles and carbon dioxide emissions must also be faced in EU policy.

B SEA could provide a powerful planning tool with which to take account of these impacts, and a methodology with which to integrate environmental objectives into the Common Transport Policy.

This data is incomplete, which could lead to problems. For example, incomplete datasets on protected areas could lead to wrong assumptions. Looking at the maps in Part 3 may suggest moving a road or rail development away from a certain site. In countries with inadequate national protected area systems this could lead development to unprotected areas of nature conservation importance.

If the methodology is recognised as valid, the approach could be applied to other datasets, such as land cover, or habitat maps. Where more detailed data already exists, it should be used for more complete analysis. For example, it would be very useful if a similar analysis was done for the pre-TENs transport infrastructure in Europe allowing interesting comparisons between Member States' past and potential environmental record. Further work on the approach set out in this report, and particularly on building effective and useful databases, is urgently needed to create an SEA methodology that covers a wide range of environmental issues. Only this can start to protect biodiversity across Europe.

References

Association Aménagement-Environment (1994) Le corridor nord: Evaluation globale des programmes intermodaux de transport et profils environnementaux de la région traversée: cartes et données quantitatives. A report prepared by Association Aménagement-Environment for the Ministère de l'Environnement (France).

CEC (1990) The European High Speed Train Network. COM(90) 2402, December

CEC (1992a) Green Paper on The Impact of Transport on the Environment A Community strategy for 'sustainable mobility'. COM(92) 46 fin.

CEC (1992b) Communication...Transport infrastructure. COM(92)231 fin., 11.6.92

CEC (1992c) Communication...The future development of the common transport policy - A global approach of a Community framework for sustainable mobility. COM(92) 494 final, 2.12.92

CEC (1992d) Report from the Commission...to the United Nations Conference on the Environment and Development, Rio de Janeiro, June 1992. SEC(91) 2448 final, 20.3.92

CEC (1992e) Towards Sustainability - A European Community Programme of Policy and Action in relation to the Environment and Sustainable Development, March

CEC (1992f) Trans-European Networks: Towards a master plan for the road network and road traffic. Motorway Working Group Report to DG VII, May

CEC (1993a) The future development of the common transport policy - A global approach of a Community framework for sustainable mobility. Bulletin of the EC Supplement 3/93. Drawn up on the basis of COM(92) 494 final

CEC (1993b) The development of guidelines for the trans-European transport network. COM(93) 701 final, December 1993

CEC (1993c) The European High Speed Train Network - Environmental Impact Assessment. Executive summary, October

CEC (1993d) Integrating the environment into other policy areas within the Commission. Communication to the Commission from Mr Paleokrassas and Mr Van Miert adopted 16 June 1993

CEC (1994a) Proposal for a European Parliament and Council Decision on Community guidelines for the development of the trans-European transport network. COM(94) 106 fin., 7.4.94

CEC (1994b) Growth, competitiveness, employment - The challenges and ways forward into the 21st century. White Paper

CEC (1994c) Comunicazione...Finanziamento delle reti transeuropee. SEC(94)860 del, 15.6.94

CEC (1994d) Rapport sur un réseau transeuropéen des chemins de fer. SEC(93) 2128, 3.1.94

Christophersen H (1994) Trans-European networks - The Group of personal Representatives of the Heads of State and Government - Interim report of the chairman to the Corfu European Council

Cramp S (1977-1993) Handbook of the Birds of Europe, the Middle East and North Africa: the birds of the western paleartic. Oxford University Press, Oxford 7 vols.

EC (1992a) Official Journal of the European Communities, Proposal for a Council Decision on the creation of a trans-European road network and European inland waterway network. C 236 vol.35, 15.9.92

EC (1992b) Official Journal of the European Communities, ESC Opinion on the Green Paper. C313, 30.11.92

EC (1993a) Official Journal of the European Communities, Economic and Social Committee, Opinion on the Commission Communication on the future development of the Common Transport Policy. C352 vol.36, 30.12.93

EC (1993b) Official Journal of the European Communities, Economic and Social Committee, Opinion on the second All-European Transport Conference. C 352 vol.36, 30.12.93

EC (1993c) Official Journal of the European Communities, Parliamentary Resolution on the Commission's White Paper on the further development of the CTP. C176, p.164, 28.6.93

EC (1993d) Official Journal of the European Communities, ESC various opinions... C19, 25.1.93 p.29-36

EC (1993e) Council Decision L305

EC (1994a) Proposal for a European Parliament and Council Decision on Community guidelines for the development of the trans-European transport network. (COM(94) 106 fin). C220 vol.37, 8.8.94

EC (1994b) Proposal for a Council Directive amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. (COM(93) 575 final). C130/8, 12.5.94, p.8

EC (1994c) Official Journal of the European Communities, Commission Decision of 16 December 1993 concerning the grant of assistance from the cohesion financial instrument to a stage of a project in Greece: Construction of Via Egnatia. L218, 23..8.94

EN (1994a) Nature conservation in Environmental Assessment. Report carried out by Environmental Resources Ltd

EN (1994b) Roads and nature conservation, guidance on impacts, mitigation and enhancement

EN (1994c) Strategic Environmental Assessment in the transport sector - some thoughts by English Nature. Internal discussion document, January

EP (1992a) Resolution on the Green Paper on The Impact of Transport on the Environment A Community strategy for 'sustainable mobility'. Resolution A3-0256/92

EP (1992b) Report of the Committee on Transport and Tourism on the Green Paper on The Impact of Transport on the Environment A Community strategy for 'sustainable mobility'. PE 200.978/fin.

EP (1993) Draft Opinion of the Committee on the Environment, Public Health and Consumer Protection for the Committee on Transport and Tourism on the future development of the Common Transport Policy - a global approach to the construction of a Community framework for sustainable development. PE 205.003

EP (1994) Report of the Committee on Transport and Tourism on transport and energy. PE 206.861/fin.

ERM et al. (1994) Setting Forth: strategic assessment. Commissioned by the Scottish Office. Summary report June

Europe Environment (1994) Guidelines for Trans-European Networks. europe environment, no.429, 10

EUROSTAT (1994) Personal communication including descriptive information of digitised datasets

Grimmet RFA and Jones TA (1989) Important Bird Areas in Europe. BirdLife International (previously ICBP) Technical publication no.9. Cambridge

Hellas (1994) Hellas Euro Atlas. Efsthadiadis Group, Anixi Attikis, Greece

Hellenic Ornithological Society (1994) Preliminary report on impacts to Important Bird Areas from Via Egnatia. Athens

House of Commons (1993) A Common Transport Policy, European Standing Committee A, 26 May. HMSO

House of Lords (1994) Common Transport Policy - sustainable mobility. Select Committee on the European Communities 8th report. HL Paper 50. HMSO

IEEP (1994a) Strategic Environmental Assessment: implications for the English countryside

IEEP (1994b) EC transport policy and the environment - an overview. A report to WWF International by M Ferguson et al, March

International Expert Panel for a Fixed Link Across Øresund (1993) Report of the 3rd Meeting. Copenhagen, 1-3 December

McDonald R (1993) Towards a common transport policy, EIU European Trends, 3rd quarter

NERI National Environmental Research Institute (1993a) Base-line investigations of moulting mute swans on Saltholm. Denmark, November

Øresund Consortium (1993a) Environment Øresund shore-to-shore Link 1993. Copenhagen

Øresund Consortium (1993b) Environment The Øresund Fixed Link Supplementary Hearing 1993. Copenhagen

Owens S (1993) Planning and nature conservation - the role of sustainability. *Ecos* 14:3/4

Pritchard D (1993) Towards sustainability in the planning process: the role of EIA. *Ecos* 14:3/4

RCEP (1994) Eighteenth Report Transport and the Environment. Cm 2674. HMSO london

RSPB (1994) Transport and Biodiversity: a discussion paper. Sandy

Rocamora G (1993) Les zones importantes pour la conservation des oiseaux en France. LPO

Sheate W (1994) Hearing of Experts: Strategic Environmental Assessment of the Trans-European Network for Transport, 28 June 1994, Comments by William R Sheate

Tucker G M and Heath M F (1994) Birds in Europe: their conservation status. Cambridge UK: BirdLife International (BirdLife Conservation Status no.3)

Wildlife Trusts (1994) Threats to important wildlife sites and protected landscapes from road development in south east England. A report by JR Cox, June

UN/ECE (1992) Application of Environmental Impact Assessment Principles to Policies, Plans and Programmes. Environmental Series 5. New York



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